

**EFFECT OF BATES EXERCISE ON VISUAL ACUITY
AMONG CHILDREN WITH MYOPIA AT SELECTED
SCHOOLS, COIMBATORE**

REG. NO. 301215052

A Dissertation Submitted to
The Tamilnadu Dr. M.G.R Medical University,
Chennai -32.

In Partial Fulfillment of the Requirement for the
Award of the Degree of
MASTER OF SCIENCE IN NURSING
2014

**EFFECT OF BATES EXERCISE ON VISUAL ACUITY
AMONG CHILDREN WITH MYOPIA AT SELECTED
SCHOOLS, COIMBATORE**

LIST OF GUIDES

	<u>Subject Guide</u>	Signature of the Guides
1.	Mrs. Sudha.M, M. Sc. (N). Assistant Professor, Department of Child Health Nursing, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore - 641 044.
	<u>Research Guide</u>	
2.	Mrs.V.Brindha, M.Sc.(N), Associate Professor, Department of Community Health Nursing, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore - 641 044.
	<u>Medical Guide</u>	
3.	Dr.N.Arivazhagan, D.O,B.Optom, FLVPEI, RMOAM, M.DFRHS. Senior Eye Specialist, Aravind Eye Hospital, Coimbatore - 641 014.

Certified that this is the Bonafide work of

JYOPHY.K.ABRAHAM

COLLEGE OF NURSING

Sri Ramakrishna Institute of Paramedical Sciences

Coimbatore -641 044

Submitted in Partial Fulfillment of the Requirement for the Award of the Degree of

MASTER OF SCIENCE IN NURSING

The Tamilnadu Dr. M. G. R. Medical University, Chennai –32.

Dr.T.NIRMALA, M. Sc (N)., Ph.D.
PRINCIPAL

2014

ACKNOWLEDGEMENT

I express my soulful thanks to **God Almighty** for showering their blessings on me throughout my research study.

I express my heartfelt thanks to honorable **Shri. C. Soundararaj Avl**, Managing Trustee, SNR & Sons Charitable Trust for giving me an opportunity to utilize all the facilities in this esteemed institution.

I am immensely grateful to **Prof. Seethalakshmi**, B. Sc(N)., R.N, R M., M. N., M. Phil., (Ph. D)., Former Director (Academics), College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore, for her expert guidance and support throughout the study.

My sincere thanks to **Dr. T. Nirmala, M. Sc (N)., Ph. D.**, Principal, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore for her continuous moral support throughout the study.

I extend my deep felt sincerity to **Prof. S. Girija Kumari**, M. Sc (N), Vice principal, College of Nursing, Sri. Ramakrishna Institute of Paramedical Sciences.

I express my deep sense of gratitude to **Mrs. Sudha.M, M. Sc (N), Assistant Professor** Child Health Nursing Department for her expert guidance, valuable suggestions, and constant encouragement throughout my study.

I extend my thanks to **Dr.N.Arivazhagan, D.O,B. Optom, FLVPEI, RMOAM, M.DFRHS.** Senior Eye Specialist, Aravind Eye Hospital for his encouragement and valuable suggestions.

I express my deep and sincere thanks to **Prof. Suganthi. A, M.Sc (N)., Head of the Department** for her continuous support and valuable suggestions and encouragement throughout the study.

I express my special and sincere thanks to **Mrs.Brindha, M.Sc (N)., Associate Professor** and **Mrs. Uma Devi, M.Sc (N), Assistant Professor.,** College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences for their thoughtful guidance and constant encouragement.

I express my deep sense of gratitude to **Prof. J. Kalaichelvi, M. Sc (N)., M.Phil.,** Nursing Superintendent, Sri Ramakrishna Institute of paramedical sciences.

I express my special and sincere thanks to **Mrs. Beryl Juliet V.S, M.Sc (N)., Associate Professor., Mrs. Vasumathi. A, M.Sc. (N)., Assistant Professor ,** Child Health Nursing Department for their moral support and valuable suggestions in completing the study.

I extend my sincere thanks to **all the Head of the Departments and Research Committee Members** for their moral support and valuable suggestions in conducting this study.

I extend my deep sense of gratitude to **CMS Primary School, Shri Vijay Vidhyalaya, Rasakondalar Matriculation Higher Secondary School, PSG Primary School** for giving permission and to be kind and cooperative throughout my study.

I extend my special thanks to the **Children** who participated in the study for being obedient and cooperative throughout the study.

I am equally grateful to the **Librarians** and **Office Staffs** of Sri Ramakrishna Institute of Paramedical Sciences for their timely assistance in many ways in preparing the manuscript.

I express my sincere thanks to my **Family, Friends and Classmates** for their love and tolerance also who provided me timely support, guidance and motivation throughout my research.

Finally I thank all whom I have not mentioned but nevertheless have been instrumental in the successful completion of the dissertation.

CONTENT

CHAPTER	TITLE	PAGE NO
I	INTRODUCTION	
	1.1. Need for the study	5
	1.2. Statement of the problem	8
	1.3. Objectives	8
	1.4. Operational definition	9
	1.5. Hypothesis	9
	1.6. Conceptual frame work	9
	1.7. Projected outcome	12
II	REVIEW OF LITERATURE	
	2.1 Literature related to Myopia	14
	2.2 Literature related to Bates exercise	18
	2.3 Literature related to eye exercises and Visual Acuity in Myopia.	20
III	METHODOLOGY	
	3.1. Research approach	26
	3.2. Research design	26
	3.3. Setting	27
	3.4. Population	27
	3.5. Sampling	27
	3.6. Criteria for sample selection	27
	3.7. Variables of the study	28
	3.8. Tools for Data collection	29
	3.9. Pilot study	33
	3.10. Procedure for data collection	34
	3.11 Techniques Of Data Analysis And Interpretation	35

CHAPTER	TITLE	PAGE NO
IV	DATA ANALYSIS AND INTERPRETATION	
4.1	Demographic details of Children with Myopia	38
4.2	Information regarding the vision and its related factors among Children with Myopia.	44
4.3	Assessment on level of Visual Acuity among Children with Myopia	55
4.4	Effect of Bates Exercise on Visual Acuity among Children with Myopia	57
4.5	Association between level of Myopia and selected variables among Children with Myopia	61
V	RESULTS AND DISCUSSION	
5.1	Demographic Details of Children with Myopia	65
5.2	Information regarding the vision and its related factors among Children with Myopia	66
5.3	Assess the level of Visual Acuity among Children with Myopia	67
5.4	Evaluate the level of Visual Acuity among Children with Myopia after administering Bates exercise	68
5.5	Association between level of Myopia and selected variables among Children with Myopia	70

CHAPTER	TITLE	PAGE NO
VI	SUMMARY AND CONCLUSION	
	6.1. Major findings of the study	71
	6.2. Limitation	73
	6.3. Recommendation	73
	6.4. Nursing implication	74
	6.5. Conclusion	75
	REFERENCES	
	APPENDICES	

LIST OF TABLES

TABLE NO	TITLE	PAGE NO
4.1.	Frequency distribution of children with Myopia by age	38
4.2.	Frequency distribution of children with Myopia by gender	38
4.3.	Frequency distribution of children with Myopia by education	39
4.4	Frequency distribution of children with Myopia based hobbies	41
4.5	Frequency distribution of children with Myopia by interested games	41
4.6	Frequency distribution on parents of children with Myopia	43
4.7	Frequency distribution of children with Myopia by duration of wearing glasses	45
4.8	Frequency distribution of children with Myopia based on knowledge of optical power	45
4.9	Frequency distribution of children with Myopia based on the history of headache	47
4.10	Frequency distribution of children with Myopia by duration of headache	47
4.11	Frequency distribution of children with Myopia by history of eye infection	49

TABLE NO	TITLE	PAGE NO
4.12	Frequency distribution of children with Myopia based on number of books read in a week	50
4.13	Frequency distribution of children with Myopia based on the type of lighting used for reading and writing	50
4.14	Frequency distribution of children with Myopia based on number of hours watching television	52
4.15	Frequency distribution of children with Myopia based on distance of watching television	53
4.16	Frequency distribution of children with Myopia based on duration of computer usage	53
4.17	Level of Visual Acuity among children with Myopia before Intervention	55
4.18	Level of Myopia among children before Intervention	56
4.19	Level of Visual Acuity among children with Myopia after Intervention	58
4.20	Level of Myopia among children after Intervention	59
4.21	Effect of Bates exercise on Visual Acuity among children with Myopia	59
4.22	Association between level of Myopia in the right eye with selected demographic variables before Intervention	61

TABLE NO	TITLE	PAGE NO
4.23	Associations between level of Myopia in the right eye with selected variables related to vision before Intervention.	62
4.24	Association between level of Myopia in the left eye with selected demographic variables before intervention	63
4.25	Association between level of Myopia in the left eye with selected variables related to vision before intervention.	64

LIST OF FIGURES

FIGURE NO	TITLE	PAGE NO
1.1	Conceptual framework	13
3.1	Schematic representation of sampling process	28
3.2	Schematic representation of variables	29
4.1	Distribution of children with myopia by age	39
4.2	Distribution of children with myopia by gender	40
4.3	Distribution of children with myopia by education	40
4.4	Distribution of children with myopia based on hobbies	42
4.5	Distribution of children with myopia based on interested games	42
4.6	Distribution of children with myopia based on years of wearing glasses	46
4.7	Distribution of children with myopia based on knowledge of optical power.	46
4.8	Distribution of children with myopia based on the history of headache.	48
4.9	Distribution of children with myopia by duration of headache.	48
4.10	Distribution of children with myopia based on eye infection	49
4.11	Distribution of children with myopia by number of books read in a week.	51

FIGURE NO	TITLE	PAGE NO
4.12	Distribution of children with myopia by type of lighting used for reading and writing.	51
4.13	Distribution of children with myopia based on number of hours watching television.	52
4.14	Distribution of children with myopia based on distance of watching television.	54
4.15	Distribution of children with myopia based on duration of computer usage.	54

LIST OF APPENDICES

APPENDIX	TITLE
I	Permission letter for conducting the study
II	Letter requesting to validate the research tool and content validity
III	Tool for data collection
IV	Certificate of English Editing
V	Certificate of Tamil Editing

Abstract

Vision plays a vital role in the learning process and among all the refractive errors, myopia is more common in children. The aim of the present study was to assess the effect of Bates exercise on visual acuity among children with myopia. Pre experimental one group pre test, post test design was used to conduct the study. The study was done in CMS Primary School, PSG primary School, Rasakondalar and Shri Vijaya Vidhyalaya School at Coimbatore. Out of 372 children, 43 children were selected using purposive sampling technique. Visual acuity of these children were assessed using Snellen chart. Among 43, parents of 42 children were willing to participate in the study. Bates exercise was demonstrated to these children and the intervention was continued. The duration of each session was 30 minutes and 2 sessions per day was given for 4 weeks. The level of visual acuity was reassessed using Snellen chart after 4 weeks. The obtained data were analyzed using paired 't' test. Results showed that, in the right eye the mean score of visual acuity before Bates exercise was 4.35 with a standard deviation of 1.51. The mean score of visual acuity after Bates exercise was 5.40 with a standard deviation of 1.35. The calculated t value is 6.418 which is significant at 0.001 level. In the left eye the mean score of visual acuity before Bates exercise was 4.67 with a standard deviation of 1.33. The mean score of visual acuity after Bates exercise was 5.43 with a standard deviation of 1.53. The calculated 't' value is 4.858 which is significant at 0.001 level. This shows a significant difference in visual acuity among children with myopia before and after implementation of Bates exercise. Hence it is concluded that Bates exercises is an effective intervention to improve the visual acuity of children with myopia.

INTRODUCTION

Healthy children are the greatest resource and pride of the nation. They are precious to their parents and ought to be healthy to become a productive member of the society. A child starts from being an infant; grows in size and height to become a child, a teenager then into an adult. Children are the ones who are very vital for deciding how the world is going to be after some years. Children grow to become successful in most parents dream, on the contrary, all children are not able to turn out to be successful in their life.

Human eye is the most precious of all our sense organs. It helps us to see, appreciate and capture all that is important in the world to our life. It is the mirror of the soul and bodies, and a window to the outside world. The objective of learning begins in childhood and the accuracy of a child's vision can immensely affect or alter the child's learning capacity. In fact, visual acuity is fundamental to the child's future carrier, as the act of breathing to sustain life (Pavithra, 2008).

Eye is the organ of sight, situated in the orbital cavity and surrounded by six muscles and is supplied by optic nerve. Human eye is an organ that reacts to light and has several purposes as a conscious sense organ. The eye allows the retina to have conscious light perception and vision including color differentiation and perception of depth (Willson, 1995).

Vision is the interpretation of the retinal images. "What we see, we remember and what we remember, we imagine to see". Perfect eye sight is the coordination of seeing, memory and imagination. "The only thing worse than being blind is having sight but no vision"- Helen Keller (Dennison, 2014).

Vision occurs when images are received by the eye and transmitted to the brain. Vision is a complex process that involves the eye, the brain, and the pathways between them. The eye is somewhat similar to a video camera connected to a computer. Just as a video camera has a shutter and a lens system that controls the light and focuses the image, the eye has a system that controls the amount of light allowed in and focuses light rays on to the back of the eye. This system includes the eyelids, cornea, iris, pupil, and lens (Bates, 2009)

School going years is considered as the wonder years in a person's life. These years are also the formative year which determines one's physical, intellectual and behavioural development. The ultimate moulding of a person's personality and potentiality rest with his nature, surrounding and quality of eye sight. Any problem in the vision during the formative years can hamper the intellectual development, maturity and performance of a person in future life (Pavithra, 2008).

Vision plays a vital role in the learning process. A child's health encompasses their physical, emotional and social development and visual loss in childhood can significantly impair progress in any of these dimensions. Quality of vision is an important factor in leading a full and useful life at all ages. It is crucial to infant development, to a child's education, to employment prospects, to the pursuit of leisure activities and to the enjoyment of retirement. An ocular disability, initially sight, can become a major visual handicap if not promptly identified and treated (Bates, 1913).

Children who lack basic visual skills often struggle unnecessarily in school because, major portion of learning is done visually. Learning is accomplished through complex and interrelated process, one of which is vision. The eyes and the visual system grow and develop from the brain, making vision a fundamental factor in thinking and learning (Bates, 1913).

Myopia has been known for more than 2000 years and was first described by the ancient Greeks. Myopia is a condition in which distant objects are not displayed sharply in the retina behind the optical system of the eye because, the rays converge before they hit the retina. The main symptom is a difficulty with distant vision. The earlier the myopia starts, the more severe it is likely to become. By the time early adulthood is reached, the level of myopia has usually reached its peak. Myopia is assessed by checking the visual acuity of the eye (Gazzard et al, 2007).

Visual acuity can be checked by the Snellen chart which is an universally accepted tool. Snellen chart is checked at 6 meters and the normal vision is denoted as 6/6 and is increased to 6/60, which is severe myopia. Normal vision is the ability to see clearly at all distances without glasses. This is commonly referred to as “20/20” vision. The expression “20/20” is a description of visual acuity based on how clearly images such as letter, numbers, or pictures are seen on a standardized eye chart which is checked at a distance of 20 feet (Schmid and Brown, 2014).

People who have high myopia are likely to experience floaters, shadow-like shapes which appear singly or in clusters, in the field of vision. The root cause lie in the food, climate, classrooms, genes, habits, or life style which is still not confirmed (Ahmed and Mian, 2001).

Myopia can be due to too much near work, such as writing, reading and computing. Severe short sight has a slightly increased chance of developing glaucoma, macular degeneration and retinal detachment which can lead to blindness. Children are starting to wear prescription glasses as early as standard one in primary schools. They are also upgrading their glasses to higher powered pairs every few months as they cope with the school workload as well as near point vision stress generated by the computer games and play stations (Vision Therapy Manual, 2006).

There is a relationship between myopia and higher IQ and its hindrance in school achievement. A common explanation for myopia is near-work. Among several explanations, one is that, the myopic child is better adapted at reading, and studies more, which increases intelligence. The reverse explanation is that the intelligent and studious child reads more, which causes myopia. Still another explanation is that pleiotropic gene(s) affect the size of both brain and eyes simultaneously. According to the two most recent studies, higher IQ may be associated with myopia in school children, independent of books read per week (Hennessy and Badjou, 2013).

Dr. William Horatio Bates an Eye specialist, born in 1860 formulated the Bates eye exercise. In 1920 he published the book “Perfect Sight by Treatment without Glasses”. His exercise is 85 years old method. He viewed that every part of the body can perform efficiently .Vision therapy can restore normal vision. If there is good vision habits the elimination of glasses are possible. Stress and strain are most probably the root cause of myopia (Vision Therapy Manual, 2006).

The Bates method is an alternative therapy that includes a series of exercises like sunning, palming, swinging, simple blinking and simple eye exercises. Bates eye exercise have been used since before the middle ages (1920). The principle behind natural eyesight improvement is dynamic relaxation (use, or motion, without undue tension). Blurry vision is caused by tense eye muscles, and relaxation of those muscles brings back clarity, that is the core of it. The Bates Method consists of various techniques to release the tension of those muscles, as 'one size does not fit all' in this regard. It reduces eye strain, brings better depth perception, helps seeing colours brighter, prevents ocular headaches, improves memory and brings better visualization (Huxley, 2013).

1.1 Need for the Study

The present total population of children in the world is 7 billion. In India, 31% of the population, i.e., 190,075,426 male and 172,799,553 female are children (Census, 2012). According to Prevent Blindness America Association, one in four school-age children have vision problems that, if left untreated, can affect learning ability, personality and adjustment in school. Children often have a progressive form of nearsightedness, or myopia that worsens throughout

childhood. In India about 40% of population are in the age group 6-10 years with eye disorders. The prevalence rate of myopia was 3.76% in the age group of 6–10 years (Isaf and Mian, 2001).

Vision is easily corrected with eyeglasses and the visual acuity stabilises at the age of twenty years. Progressive myopia or nearsightedness is predominantly caused by genetics. Children inherit a tendency to develop the eye condition from their parents. The manner in which a person uses their eyes, such as often performing detailed or up-close work may also have an influence on the progression of nearsightedness (Boxer et al, 2013).

A study was conducted on the prevalence of myopia in students of Srinagar city of Kashmir. This study was done to evaluate factors associated with myopia. The distant visual acuity of each eye was measured using Snellen E chart at 6 meters with standard lighting. The study was done among school children grades 1-12 standard. The overall prevalence of myopia was 4.74%. In the age group of 6-10 years, it was 3.76% and 4.9% in age group of 11-15 years. Environmental factors such as educational level, occupation and individual income had an association with the prevalence of myopia (Isaf and Mian, 2001)

A study reported that there is a faster rate of progression of myopia among children who spent a greater amount of time on close up work. Basically, there are six muscles on the outside of the eye, and they are moving it around. Ideally, these muscles are easily following visual interest. The problem could be emotional reasons or physical stress. The action of straining essentially squeezes the eyeballs. This makes vision blurry, and it alters the field of vision on the retina. A

number of alternative therapies exist including eye exercises and relaxation techniques. Eyesight is often worse during periods of stress, fatigue, illness, etc and better during periods of relaxation. In the morning after a good night sleep, or during a vacation, eye is more relaxed. The theory that eyesight cannot be improved naturally, does not agree with many people's experiences of their own eyesight. People who have maintained excellent eyesight are people who have not acquired strained vision habits. The key to normal sight is relaxation or relaxed vision habits (Kokkinakis, 2012).

In the present scenario, due to the heavy workload in the schools which follow the difficult syllabus and other related problems, it is very essential to have a remedy for improving the visual acuity. Proper check up and school health programmes should have concentrations among the growing children. Researcher identified this problem as vital; since it affects the learning process thereby attack their future life. The incidence of myopia increases with level of education, and many studies have shown a correlation between myopia and a higher intelligence quotient (IQ) (Borish and Duke, 2014).

The World Health Organisation had launched the global initiative vision 2020 in 1999 with the slogan “The Right To Sight” that had five priority areas. They have been chosen on the basis of the burden of blindness and the feasibility and affordability of interventions to prevent and treat them. In context of vision 2020, the priorities for action to reduce childhood blindness in India are refractive errors, cataract related amblyopia and corneal diseases. The ultimate objective is to eliminate avoidable blindness by the year 2020 (Pavithra, 2008).

Visual corrective aids such as contact lenses are established methods of correcting the defective distant vision arising from myopia. Other methods include visual training, biofeedback training, the use of bifocal spectacles, contact lenses, the instillation of atropine eye drops, beta blocker eye drops, lowering the intraocular pressure and surgery. The optical correction of myopia and optimal strategies to prevent the progression of myopia have been developed and prescribed largely by optometrists. Presently some of the other treatment measures used are orthokeratology, biofeedback visual training which includes Bates exercises and traditional Chinese exercises (Saw and Gazzard, 2002).

The researcher came across many numbers of children with refractive errors during the visit to the eye hospital and parents discussed about their hesitation in wearing spectacles due to the hindrance in regular play activities. This leads to improper usage and further worsening of the condition. In the present scenario, the educational systems and the recreational activities have changed, which again worsens the visual acuity. So the researcher selected this topic to see if eye exercises could help in improving the visual acuity among school children.

1.2. Statement of the Problem

Effect of Bates Exercise on Visual Acuity among Children with Myopia in Selected Schools, Coimbatore.

1.3. Objectives

1.3.1. Assess the Level of Visual Acuity Among Children with Myopia.

1.3.2. Evaluate the Level of Visual Acuity Among Children With Myopia After Administering Bates Exercise.

1.4. Operational Definition

1.4.1. Effect:

Refers to the change in visual acuity among children with myopia after Bates exercise.

1.4.2 Bates Exercise:

Refers to the series of eye exercise which includes sunning, palming, swinging, simple blinking and simple eye exercises.

1.4.3 Visual Acuity:

Refers to the clarity and sharpness of vision, which is measured by Snellen chart, at a distance of 6 meters and the normal visual acuity is 6/6.

1.4.4 Children with Myopia:

Refers to the children who are studying fourth and fifth standard, wearing spectacles and reported to have short sight, in selected schools, Coimbatore.

1.5 Hypothesis:

H₁ – There will be a significant difference in visual acuity among children before and after administering Bates exercise.

1.6 Conceptual Framework

Conceptual framework is a theoretical approach to the study of problems that are scientifically based and emphasized on the selection, arrangement and classification of the concepts.

Conceptual frame work for this study was developed on the basis of modified Weidenbach's Prescriptive Theory. She proposed her theory in 1964 as a prescriptive theory of nursing. Prescriptive theory directs action towards an explicit purpose, prescription and realities. A nurse develops a prescription based on a central purpose and implements it according to the realities of the situation. Central purpose in the model refers to what the nurse wants to accomplish. It is the overall goal towards which a nurse strives; it transcends the immediate intent of the assignment or task by specifically directing activities towards the client's goal.

Prescriptions refer to the plan of care for a client. It specifies the nature of the action that will fulfil the nurse's central purpose and gives rationale for that action.

Realities refer to the physical, physiological, emotional and spiritual factors that come into a play in a situation involving nursing actions. The five realities identified by Weidenbach's are agent, recipient, goal, means and framework.

- Weidenbach's view nursing as an art based on goal directed care.
- Weidenbach's vision of nursing practice closely parallels the assessment, implementation and evaluation steps of the nursing process.
- According to her factual and practice knowledge, judgement and skills are necessary for effective nursing practice.
- According to Weidenbach's, nursing practice consists of identifying a clients need for help, ministering the needed help and validating that the need for help is met.

- Weidenbach views the client as an individual with unique experiences and understanding. She determines a client's need for help based on the existence of a need. She also identifies whether the client realizes the need, what prevents the client from meeting the need and whether the client can meet the need alone (Kozier and Erb, 2001).

The attributes adopted in this study are:

Central purpose

Central purpose of the study is to improve the level of visual acuity among children with myopia.

Prescription

The investigator plans the prescription that will fulfil the central purpose (improving the level of visual acuity) by identifying the various means to achieve the goal. Thus the investigator selected Bates exercise to improve the level of visual acuity.

Realities

According to this theory the agent is the investigator and recipients were children with myopia. Schools were selected as the framework with a goal to improve the level of visual acuity by means of administering Bates exercise.

Identification

This includes identification of the need for improving the level of visual acuity.

Ministration

It refers to administration of Bates exercise to children with myopia.

Validation

It refers to the evaluation of the effectiveness of Bates exercise. A positive outcome presents the improvement of the level of visual acuity among children.

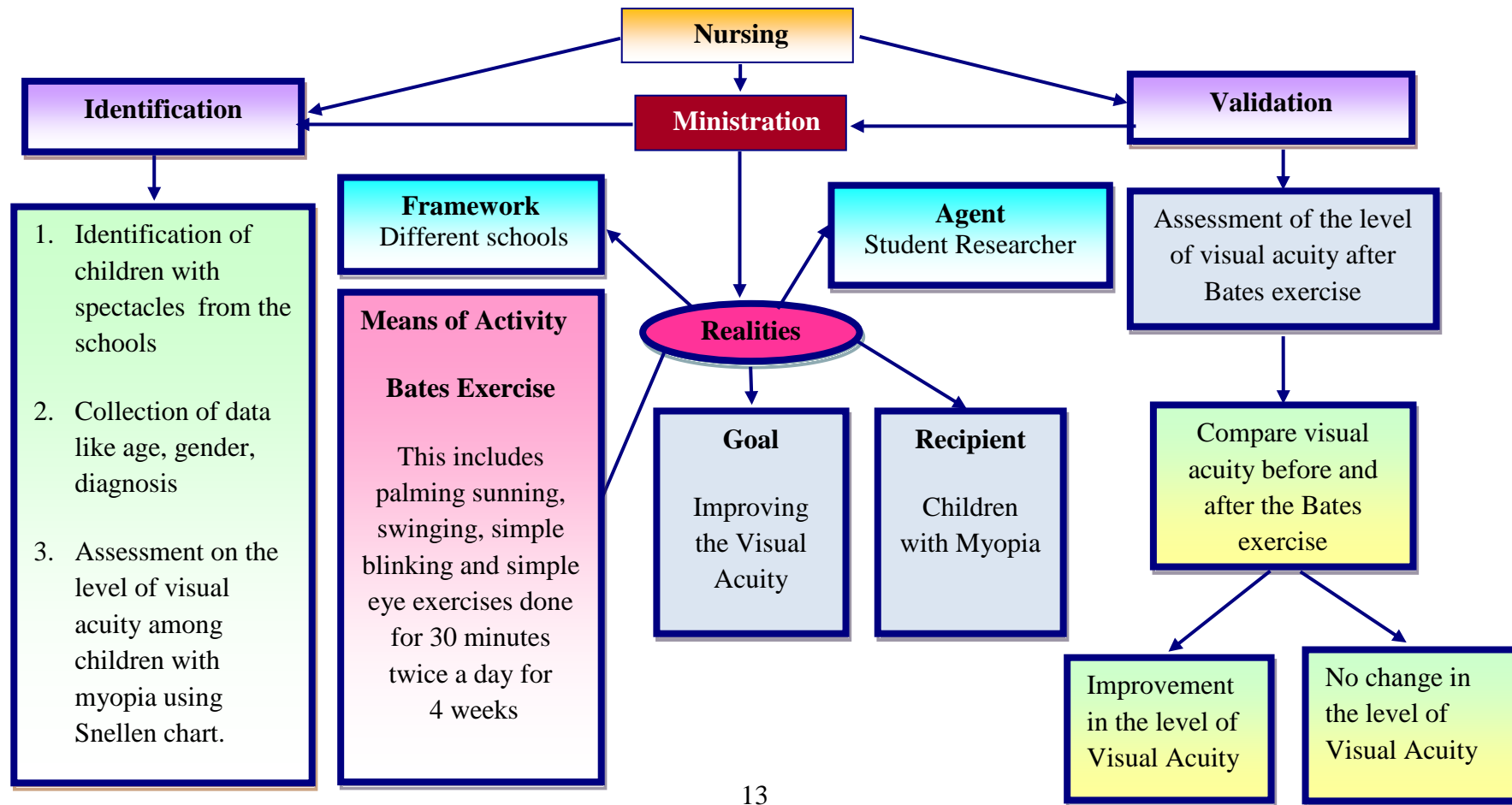
(Figure 1.1)

1.7. Projected Outcome

The administration of Bates exercise will improve the level of visual acuity and will bring improvement in quality of vision among children with myopia.

Figure 1.1

Conceptual Framework Based on Modified Weidenbach's Prescriptive Theory



REVIEW OF LITERATURE

Literature review is an essential component for the researcher to understand the research problem and its aspects. A thorough literature review will assist the researcher with the selection or development of the theoretical and methodological approaches to the problem. The literature review is discussed under the following headings.

2.1 Literature related to myopia

2.2 Literature related to Bates exercise

2.3 Literature related to eye exercises and visual acuity in myopia

2.1 Literature Related to Myopia:

Isaf and Mian (2001) conducted a study on prevalence of myopia and evaluated the factors associated with myopia among students of Srinagar city of Kashmir, India. The distant visual acuity of each eye was measured using Snellen E chart at 6 meters with standard lighting. The study was done among school children grades 1-12 standard and a total of 4360 students were included. Results showed that 207 students had myopia of which 141(3.23%) were girls and 66 were boys and high myopia was found in 6 students. Environmental factors such as educational level, occupation and individual income have been shown to associate with the prevalence of myopia.

Kalikivayi and Manish (1997) conducted a study to determine the prevalence of visual impairment due to refractive errors and ocular diseases in lower middle class school children of Hyderabad, India. A total of 4,029 children, which included 2,348 males and 1,681 females, in the age group of 3 to 18 years

from 9 schools were screened with a detailed ocular examination protocol. Among 3,669 children in whom visual acuity could be recorded, 115 (3.1%) had visual acuity less than 6/18 in the better eye (equivalent to visual impairment), while 41 (1.1%) had visual acuity of 6/60 in the better eye (equivalent to legal blindness) out of which 18 (0.5%) had visual acuity less than 6/60 in the better eye (equivalent to economic blindness). Of 115 children who presented with initial visual acuity less than 6/18, vision improved to more than or equal to 6/18 with refraction in 109 (94.8%) and the prevalence of myopia was found to be 8.6%.

Quinn (1999) in his article explained that myopia is a leading risk factor for acquired blindness in adults because it predisposes individuals to retinal detachment, retinal degeneration and glaucoma. It typically develops in the early school years but can manifest into early adulthood. Its aetiology is poorly understood but may involve genetic and environmental factors such as viewing close objects. He looked at the effects of light exposure on vision and found a strong association between myopia and night time ambient light exposure during sleep in children before they reach two years of age.

Guggenheim et al (2006) conducted a cohort study on risk factors for myopia and correlations in refractive errors between siblings in Singapore. Refractive error and ocular biometric parameters were measured under cycloplegia. 315 children were included in the study of age group 7–9 years. Yearly follow up sessions for the next 3 years were done by using consistent clinical procedures.

The time children spent for performing a variety of near work-related tasks was obtained from questionnaires. Familial influences were assessed by calculating between sibling correlations. The findings of this study showed that sibling correlation in refractive error was 0.447, suggesting that familial factors account for 63–100%. All ocular component dimensions were correlated significantly between siblings, especially for corneal curvature and vitreous chamber depth, the major structural determinants of refraction. The amount of time siblings spent engaged in near work tasks (reading, watching TV, playing video games, computing) and in outdoor activities was also highly correlated between siblings.

Taylor et al (2008) conducted a cohort study among school children with myopia in Singapore to determine the factors of myopia. 250 children were included in the study and were assessed for the relationship between parental myopia and IQ scores with prevalence of myopia. The Chi-Square test was used to find out the association. It was found that there is a link between parental myopia, IQ scores and subsequent myopia development and it was not associated with reading books per week.

Vashisht and Meenakshi (2008) conducted the study on prevalence of refractive errors in school children in the rural areas of Haryana. This study was a cross sectional study done among the children of 6 to 15 years studying in 1 to 10th standard in Government Senior Secondary Schools in Haryana. Out of 16 schools, four schools were randomly selected. Visual acuity test was performed by Snellen E chart. The result showed that out of 1265,17 children were found to have defective vision (less than 6/9), 1.74% of students have one eye affected where as 10.36% have both eye affected. The prevalence of myopia, hyperopic or

astigmatism was more in girls compared to boys. Prevalence of myopia and astigmatism was more in higher age groups and prevalence of hyperopia was more in lower age groups.

Batra (2007) conducted a study in different schools of Punjab to know about the refractive errors among children which is a leading cause of blindness. The authors concluded that reduced vision is because of uncorrected refractive errors and is more common among children. He also stated that vision screening should be done earlier to take proper treatment.

Saw et al (2002) conducted a study on myopia to arrest the progression using two different methods like atropine eye drops and placebo. It was found that the rate of progression of myopia is lower in children who had been administered with atropine eye drops than those given placebo. However atropine is associated with short term side effects such as photophobia and possible long term adverse events including light induced retinal damage and cataract formation.

Kartz (1996) conducted a study on epidemiology of myopia. They considered the risk factors like family history of myopia, close up work and genetic factors. They also studied the relationship between close up work and genetic factors. It was found that in population with little exposure to close up work, genetic factors played an important part in development of myopia. Population who had more close up work had a high prevalence of myopia and genetic factors did not have a large influence.

Rose and Morgan (2008) conducted a study on outdoor activity and the prevalence of myopia in children. He selected the children between 6-12 years of

age and found that the higher levels of outdoor activity were associated with more hyperopic refractions and lower myopia prevalence. Children who combined high levels of near work with low levels of outdoor activity had least hyperopic mean refraction whereas students who combine low levels of near work with high levels of outdoor activity had the most hyperopic mean refraction. No consistent association between refraction and measures of activity were seen in 6 year old samples.

Cooper et al (2012) conducted a study on several type of interventions to slow the progression of myopia in children. They included eye drops, under correction of nearsightedness, multifocal spectacles and contact lenses on the progression of nearsightedness in myopic children younger than 18 years. They compared the interventions of interest with each other, to single vision lenses, placebo or no treatment. In this study, the largest positive effects for slowing myopia progression were exhibited by anti-muscarinic medication (eye drops) but they either cause light sensitivity or blurred near vision. Multifocal spectacles were found to yield a small slowing of myopia progression slightly.

2.2 Literature Related To Bates Eye Exercise

Huxley (2013) stated in an article that Dr Bates had helped thousands of adults and children to achieve perfect sight without the use of glasses. The Bates exercise is taught in many countries around the world by Bates teachers who are in one way or another had been taught by Dr Bates, his wife, Emily Bates or their disciples over an 86-year timeframe. The eyes, just like any part of the body, are subjected to stress, emotions, mind-body interaction, and physical habits. Dr William Bates' method is commonly referred to as the Bates Method, or more broadly, natural vision therapy, natural vision correction, eyesight improvement, or even eye exercises for better vision. The Bates Method is a psychosomatic

approach to vision impairment. He believed that eyeglasses can be harmful and they are merely a crutch and tend to perpetuate refractive error that they are intended to correct.

Suresh (2007) wrote an article about the Indian ophthalmologist, Dr RS Agarwal, who was interested in Dr Bates' work and founded the School for Perfect Eyesight at the Sri Aurobindo Ashram in Pondicherry(1930) In his article "My visit to Pondicherry" he explained about the training in the "School for perfect eye sight ",a part of Aurobindo Ashram. He explained that his eye sight became clearer, and his optical power changed from 1.5 Dioptres to 0.5 Dioptres and still remain the same over the years.

Gopinathan et al (2013) conducted a clinical study on 66 patients with cataract. The study was done in two groups of 4 sub groups each of myopia, hypermetropia, astigmatism and presbyopia by random sampling method. Group A was subjected to Bates eye exercise; Group B was subjected to trataka yogakriya. The methods used for assessment were retinoscopy, autorefractometer and keratometer. The result showed that none of the patients were cured and markedly improved in eye exercises group and in trataka group. In eye exercises, moderate improvement was observed in one patient, mild improvement was observed in 20 patients and no improvement was observed in 10 patients whereas by trataka, moderate improvement was improved in two patients, mild improvement was observed in 18 patients and no improvement was observed in 12 patients of cataract.

Felger (2013) conducted a study group among junior level of biomedical engineering course students to know the causes of myopia and ways to prevent it. The goal was to investigate the scientific merit of Bates method. Bates method

provided physiological mechanism whereby the ciliary muscles were not allowed to perform their accommodation function under stress because they may not contract and cause eyes to elongate. He also found that near work habits and school works would act to induce and aggravate myopia.

2.3 Literature Related to the Effect of Eye Exercise on Visual Acuity in Myopia

Mohamed (2013) conducted a study to investigate the effectiveness of specifically designed eye exercises program on myopia control for Saudi female adolescents. Fifteen female students were recruited from two schools in Riyadh city. They ranged in age from 12 to 15 years. A program of eye exercises was practiced by all subjects for six weeks. Visual acuity was measured by the use of an auto refraction device before and after six weeks of training. The results revealed a significant improvement of visual acuity in both right ($p=0.028$) and left eyes ($p= 0.020$) indicating that eye exercises as vision therapy-based program could improve visual acuity for female adolescents with myopia.

Vandhana and Desai (2011) conducted a randomized control study on effect of eye exercises on myopia in 30 subjects of age ranging between 18 and 25 years. Both sexes having myopia and not having any other eye diseases or injury were included in the study. The subjects were randomly assigned into experimental group and control group by closed envelop method. Snellen eye chart and near point of convergence were taken as outcome measure. Information about the exercises was explained to experimental group and control group was not receiving any eye exercises. Eye focussing exercises have been taught to the

subjects with 10 repetitions, 3 sets, twice daily for 4 weeks. After the intervention subjects were assessed and the values were statistically analysed with pre treatment values. It was found that the eye exercises were effective in improving visual acuity and near point of convergence.

Saw et al (2002) wrote an article about myopia and its various treatments, including the mechanism and efficacy of these treatments to arrest progression of myopia. Various treatments includes the alteration pattern of spectacle wear, bifocal and multifocal lenses, contact lenses, orthokeratology, atropine and pirenzepine eye drops, tropic amide eye drops, ocular hypotensives, biofeedback, visual training exercises, traditional Chinese treatments including Qi Qong exercises.

Bambridge (2002) conducted a case study on approaching myopia holistically in a patient to reduce spectacle strength and use of holistic techniques to induce changes in myopia. He included holistic healing techniques like craniosacral therapy, Aromatherapy, self healing methods of Meir Schneider, which involved breathing exercises, body stretching, Alexander technique and Bates method which included sunning palming, swinging, simple blinking and simple eye exercises. The result showed an increase in acuity, a loosening of tension and a heightening of sensation of perception.

Wei (2011) conducted a study to explore effective measure of preventing myopia and to guide myopia prevention. It was an experimental study performed to the third and fourth grade students in the affiliated primary school of Jinan University. 135 pupils of grade 4 were chosen as experimental group. 240 pupils

were chosen as control group one and 135 pupils were taken as control group two. 98 grade 1 junior middle school students were chosen as internal control. The intervention measures were including health education, national pupils eye exercises and a new eye exercises based on traditional Chinese medical treatment and the myopia prevention education was given to their parents. No intervention was conducted among the control groups. It was found that myopia rate of experimental group one (51.1%) was brought down by 27.9% than control group one (79.0%). Myopia rate of experimental group two (57.2%) was brought down by 12.9% than control group two (70.1%). The myopia rate of experimental group one and two were lower than internal control group. The authors concluded that preventive measures of Myopia were effective.

Berens et al (2012) conducted a study on visual training in 80 patients with low myopia; the control group consisted of 60 patients. They reported that 74 of 80 (92.5%) patients improved in terms of subjective visual acuity as measured on visual acuity charts while 59 of 60 (98%) patients in the control group lost visual acuity. This difference was statistically significant and patients in the treatment group improved visual acuity than the control group.

Beresford et al (2005) conducted a study on the clinical evaluation of the see clearly method. He selected 30 subjects who had myopia, hyperopia and presbyopia, hyperopia and astigmatism for the study. Subjects first received a standard eye examination to determine their subjective refraction and visual acuity. Distance was measured with a 10' Snellen chart and near acuity was measured with a 16' Snellen chart. Subjects also received 2 audio cassette tapes with programmed sequences of exercises, eye charts designed to improve visual

acuity, fusion and ocular motility, an instruction manual, a compliance log, an eye patch and weaker corrective lenses. The result showed that 19 subjects obtained improvements in an unaided visual acuity.

Noto and Hamed (2013) conducted a study on eye exercises to enhance accuracy and letter recognition. In this study, 29 subjects were selected and there was experimental and control group. A modified serial visual presentation was used to assess the measurable effect of eye exercises. It was found that the subjects who performed eye exercises were more accurate in responding the target letters separated by one distracter and in letter identification in the post training of assessment. It was also proved that eye exercises are useful in enhancing cognitive performance on tasks related to attention and memory.

Leber and Wilson (1993) conducted a study on myopia reduction training with a computer based behavioural technique. Seven selected subjects participated in five consecutive days for one hour training sessions. One of the training subjects exhibited no change and six displayed post training reduction in refractive conditions. Thus vision training is a means of teaching myopes to both interpret blurred images and relax the ciliary muscles.

Woods (1996) conducted a study on visual training technique in 103 myopic patients, for 5 months. It is found that 30 patients (29%) showed a small improvement in visual acuity, 31 patients (30%) showed inconsistent improvements in visual acuity, 32 patients (31%) had no change, and 10 patients (9%) had a decrease in visual acuity. Seventeen of the 61 patients who demonstrated improved visual acuity returned for an examination five months after the training were completed. Two of these patients maintained the

improvement in visual acuity; the other 15 patients did not maintain the improvement. Of the 103 patients, 67 received non cycloplegic refraction after the training was completed; no change in refraction was noted.

Rosen et al (1985) conducted a study on the effect of visual training in 29 myopic subjects. There were three experimental groups; one group had the optometric evaluations for efficacy of vision therapy and rehabilitation. Second group had strengthening synaptic connection by a visual training programme with a feedback and inducing cortical reorganisation. Another group only received visual training. The results revealed a significant improvement of visual acuity in the groups who received visual training.

Rupolo et al (1997) conducted a study to investigate the effect of a visual feedback training technique through the use of vision therapy. They included adolescent group for the visual training technique and used inexpensive treatment procedures. It was found that the biofeedback technique on visual acuity brought improvement in vision.

American Optometric Association (2005) published an article in an e-book named "Are eye exercise of any value". This article explained about the Baltimore project (1944-1945) which was an investigation made to determine the effect of vision training. The children of 4-10 years included in the study were assessed before and after as well as five months after visual training. They had wide variations of general health and intelligence level. The refractive errors were as high as -9 dioptres and as low as -0.5 diopters. The result of the project showed a significant improvement in visual acuity by the end of the programme.

Hildreth et al (1999) conducted a study on visual training among 54 patients with myopia of $-0.5D$ to $-3.00D$. The visual acuity was measured using Snellen chart. The study was done for 15 to 22 months and found that 12 patients (22%) improved one to two lines in Snellen acuity, 30 patients (55%) showed no change in visual acuity and 12 patients (22%) showed a questionable improvement of one line or less in visual acuity. There were no changes in retinoscopic refraction. Eleven patients who showed definite improvement returned for evaluation at 15 to 22 months after the training. Five of these patients retained their improved visual acuity following training and two patients retained a partial improvement. Compared with the pre training visual acuity, one had worsened acuity and three had reverted back to the original visual acuity. In this group, 73% showed some improvement in visual acuity.

METHODOLOGY

This chapter deals with the description of research approach, design, setting, criteria of sample selection, sampling technique, variables of the study, materials and methods of data collection, pilot study, procedure for data collection and technique of data analysis.

3.1 Research Approach

The present study aimed to determine the effect of bates eye exercises on visual acuity among children with myopia. Hence, in view of the nature of the problem and to accomplish the objectives of the study quantitative research approach was adopted for this study. The researcher manipulates independent variable and measures the change in the dependent variable.

3.2 Research Design

Pre experimental one group pretest posttest design, was used to evaluate the effect of bates exercise on visual acuity among children with myopia. Since randomization and control group were not there in the study, pre experimental one group pretest posttest design was found to be appropriate.

3.3 Setting

The study was conducted in four schools. They were CMS primary school, PSG Primary school, Shri Vijayavidhyalaya and Rasakondalar School in Coimbatore. There were 115 children in CMS Primary school, 124 children in PSG Primary School, Shri Vijaya Vidhyalaya had 65 children and Rasakondalar school had 68 children studying in fourth and fifth standard.

3.4 Population

The target population of the study was children studying in fourth and fifth standard. The accessible population for the present study was children studying in fourth and fifth standard from CMS Primary School, PSG Primary School, Sri Vijaya Vidhyalaya and Rasakondalar School.

3.5 Sampling

Children with myopia were selected using purposive sampling technique. Out of 372 children, 43 children were selected according to inclusion and exclusion criteria. CMS Primary school had 15 children, PSG Primary School had 10 children, Shri Vijaya Vidhyalaya had 13 children and Rasakondalar School had 5 children with myopia. Totally 43 children had myopia. One child did not get consent from the parents. Hence the study was conducted with 42 samples.

3.6 Criteria for Sample Selection

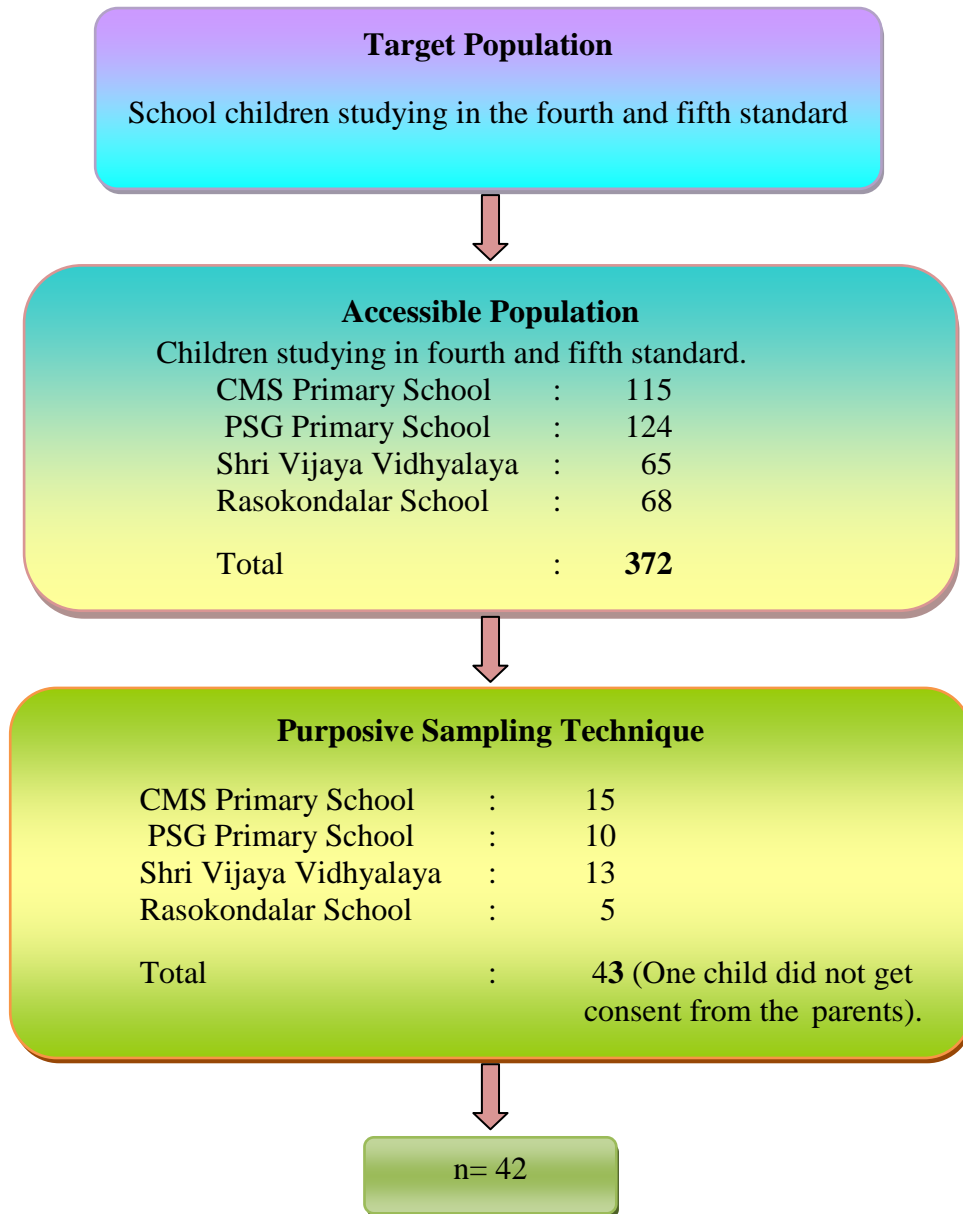
3.6.1 Inclusion criteria

1. Children who were wearing spectacles and reported to have short sight.
2. Children who had consent from parents to participate in eye exercises.

3.6.2 Exclusion criteria

1. Children who had eye infection like conjunctivitis and injuries.

Figure: 3.1
Schematic Representation of Sampling Process

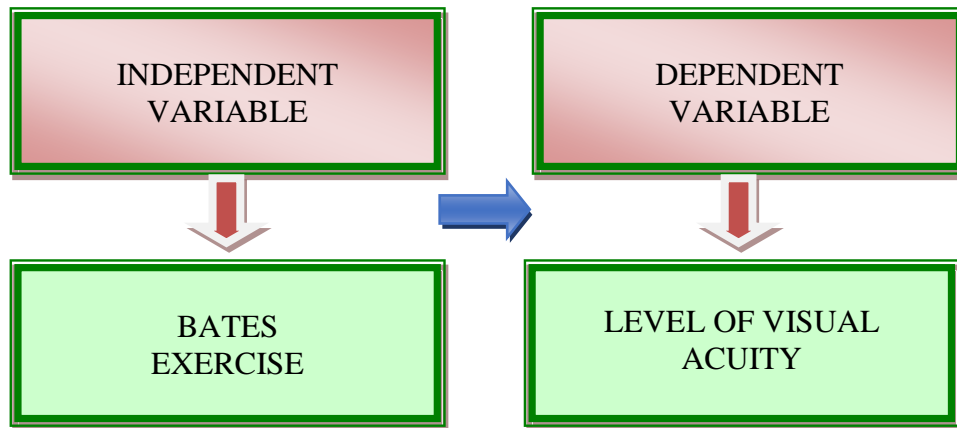


3.7 Variables of the Study

The independent variable of the present study was Bates exercise and dependent variable was visual acuity of children with myopia.

Figure 3.2

Schematic Representation of Variables



3.8 Tools for Data Collection

The following tools were used for the study

- 3.8.1: Questionnaire on demographic profile and details regarding vision and its related problems.
- 3.8.2: Snellen chart
- 3.8.3: Bates Exercise

3.8.1 Questionnaire on Demographic Profile and Details Regarding Vision and its Related Factors.

Demographic profile included the details like age, sex, education, hobbies and interested games. It also included parent's data like age, education, occupation and history of wearing glasses.

Data regarding vision of the children included history of wearing glasses, headaches along with the duration, eye infections, number of books they read, type of lighting used while doing homework, time duration of watching television and distance maintained while watching television and also the time they spent in using computers.

3.8.3 Snellen chart

The first standardized eye chart designed to measure visual acuity was introduced by Herbert Snellen in 1862. Although Snellen eye chart was introduced well over a hundred years ago, it is still the most common way to measure and report visual acuity. Visual acuity was checked first in the right eye with left eye occluded and vice versa which was measured at a distance of 6 meters. The expression “6/6” refers to a person’s normal visual acuity using the Snellen eye chart. The change in the visual acuity was interpreted as follows;

Interpretation of Snellen Chart

Visual Acuity(meters)	Scores	Results
6/60	1	High Myopia
6/36	2	High Myopia
6/24	3	High Myopia
6/18	4	Low Myopia
6/12	5	Low Myopia
6/9	6	Low Myopia
6/6	7	Normal Vision

3.8.4 Bates Exercise

Bates exercise was found by Dr. William Horatio Bates. He explained that the clear seeing of near objects is by the work of the two (external) oblique muscles flattening (lengthening) the eyeball (just as when sitting on a ball), and the process of seeing clearly the distanced objects is by the work of four (external) rectus muscles pulling (“shortening”) the eye in the opposite direction. Bates exercises refers to the series of eye exercise for children which include sunning, palming, swinging, simple blinking and simple eye exercises for improving the visual acuity among children with myopia.

Preparation:

- Provide safe and motivating environment for Bates exercises
- Make the students to sit in a comfortable position.

Articles Needed:

- 1 . Pointed pencil
2. 60 Watt bulb

Procedure:**I Sunning:** (3 minutes)

1. Sit comfortably in the table around the lamp of 60 watt bulb.
2. Close the eyes and slowly aim the light to point the face.
3. Keeping the eyes closed, imagine a distance point in the horizon and imagine gazing towards it.
4. Gently turn head from side to side and every time its turned , one of the eyes should fall into the shade. (Take about 3 seconds to move each way.)
5. The same is continued for three minutes.

II. Palming: (10 minutes)

1. Close the eyes and cover them with the hands.
2. Rest for as long as they are comfortable in position. (This could relax the eyes)

III. Swinging: (5minutes)

1. A pointed pencil is held using both hands with shoulder length apart.
2. Stand with feet with wide apart.
3. Gently sway from side to side and lift each heel of the floor as they move from side to side.
4. The head and shoulders should move in uniform towards the direction of the sway. Children should move 45 degrees to the right and left of centre.

5. Turn the heels further out until they can turn about 90 degree to the left and right of the centre.
6. Move the pointer up to eye level and gaze at the tip of it. While continuously moving the child should have the feeling of the world turning or a pendulum swinging from side to side.
7. Continue for 5 minutes and sit in a comfortable position for a while.

IV. Simple blinking: (5 minutes)

Simply move and blink the eyes for 5 minutes.

V. Simple eye exercises: (for 7 minutes)

Step 1

Move the pupil from one side to the other and try to identify an object on each side. Spot new details on that every time an object is seen. Continue for one minute.

Step 2

Roll the eyes in circular motion. Try to concentrate on what is seen as eyes are rolled. Perform the same several times for two minutes. Roll them in opposite direction also.

Step 3

Imagine number 8 and try to follow its lines with the pupils. Repeat the same for 2 minutes.

Step 4

Imagine a huge clock in front; look up at the hour 12 on the imaginary clock that is the highest point that is seen. Look at the centre of the clock (straight forward) now look at 1'o clock then again back to the centre repeat until it is done around the full circle. Repeat this for two minutes. (Simple eye exercises provide an open focus as well as relaxation of the eye muscles).

Post procedure:

- Document of the procedure
- Observe for any discomfort or any other symptoms after the procedure.

Content validity

Content validity refers to whether a measurement instrument accurately measures what it is supposed to measure. The prepared tool, Snellen chart scores interpretation along with the problem statement, objective, operational definition and hypothesis was validated by four subject experts that included three nursing faculty and one ophthalmologist. Experts were requested to give their opinions and suggestions regarding relevance, appropriateness, accuracy and degree of agreement in each item of the tool. Suggestions and recommendations given by the experts were accepted and necessary corrections were done.

3.9 Pilot Study

Pilot study was conducted to check the feasibility, practicability, validity and reliability of the study. The study was conducted at Sri Ramakrishna higher secondary school, Coimbatore for a period of ten days with fifteen samples. The children were selected according to inclusion and exclusion criteria. Researcher explained about the Bates exercise by using the pamphlet and the tool, consent form and the pamphlet was sent to the parents. The next day the signed consent form and the tool were collected and the level of visual acuity was assessed using Snellen chart. Bates eye exercise was administered for thirty minutes per day, by the researcher and once at home with the supervision of mother. The session done at home was confirmed by the researcher through telephone. The post test was done using the same scale on eleventh day. Data collected were tabulated and

analysed using descriptive and inferential statistical method. On the right eye of the children with myopia, the mean score of the visual acuity before and after Bates exercise was 16.8 (9.87) and 12.4 (5.98) respectively. On the left eye of the children with myopia, the mean score of the visual acuity before and after Bates exercise was 15.2 (6.84) and 12 (6.61) respectively. The calculated t' value was 2.899 on the right eye and 3.756 for the left eye. Both the values are found to be significant at 0.05 level respectively. The result revealed that there was a significant improvement in visual acuity after administration of Bates exercise. The researcher had not faced any difficulties and no changes were made after the pilot study.

3.10. Procedure for Data Collection

The main study was initiated after the pilot study. The validated tool was used for data collection and the period of data collection was thirty days. The study was conducted at CMS school, PSG primary school, Shri Vijaya Vidhyalaya school and Rasakondalar School, Coimbatore with a sample size of forty three children among a total population of three hundred and seventy two children. Level of visual acuity was assessed by Snellen chart. On first day researcher explained about the Bates exercise by using the pamphlet. The consent form and questionnaire was sent along with the samples to get it filled by their parents. The next day the signed consent form and the questionnaire were collected. Among forty three children, one child's parent was not willing to enrol their child in the session of bates eye exercises. Hence the remaining forty two children were included in the study. Bates exercise was administered and the duration was 30 minutes. Two sessions each day for four weeks was continued. The intervention

was administered by the researcher in a group of six for sunning, palming, swinging and simple blinking. Simple eye exercises were done individually. The intervention was given once by the researcher in the school and the samples were asked to continue the same at home under the supervision of the parents. Every day the researcher confirmed whether the exercises were done through the telephone. Post test was done after four weeks using the same Snellen chart.

3.11. Techniques of Data Analysis

Data collected were tabulated and analysed using descriptive and inferential statistical method. Mean and standard deviation were used to describe the characteristics and paired 't' test was used to find the effect of Bates eye exercise on visual acuity. Chi Square test was used to find out the association between level of myopia and the selected variables.

3.11.1 Paired 't' test

To test the hypothesis paired 't' test was applied to find out the significant improvement in visual acuity scores after administration of Bates Exercise.

$$t = \frac{\bar{d}}{SD} \sqrt{n}$$

\bar{d} = Mean of difference
 SD = Standard deviation
 n = Number of sample

3.11.2 Chi-Square (with Yates correction) test

Chi-Square test was used to find out the association between level of myopia and selected variable of children with myopia.

$$\chi^2 = \frac{\sum [(O - E) - 0.5]^2}{E}$$

Where,

O = Observed value in each category

E = Expected value in corresponding category

0.5 = Yates correction value.

DATA ANALYSIS AND INTERPRETATION

Analysis of the data can be defined as the systematic organization and synthesis of research and testing of the research hypothesis using these data. This chapter deals with the analysis and results of data collected from 42 children. The aim of the study was to determine the effect of Bates exercise on visual acuity among children with myopia.

The data gathered were analyzed and interpreted in the light of the objectives and hypothesis of the study. Descriptive and inferential statistics were employed to analyze the data. Frequency and percentage were used to represent the sample characteristics and the level of visual acuity was analyzed through mean, standard deviation and mean percentage. Paired 't' test was used to analyze the difference between pre and post test visual acuity level. Chi square was used to assess the association between the level of myopia and selected variables.

The information obtained from the Children with Myopia are organized, analyzed and presented based on the objectives.

SECTION I

Demographic details of Children with Myopia.

SECTION II

Information regarding the vision and its related factors among Children with Myopia.

SECTION III

Assessment on level of Visual Acuity among Children with Myopia.

SECTION IV

Effect of bates exercise on Visual Acuity among Children with Myopia.

SECTION V

Association between level of myopia and selected variables of Children with Myopia.

SECTION I

4.1 Demographic Details of Children with Myopia

This section deals with the demographic data of children with myopia and the parents. The demographic profile of children included age, gender, education, hobbies and interested games. The data of parents included age, education, occupation and history of wearing glasses. The data was analyzed using descriptive statistics and are summarized in terms of frequency and percentage.

Table 4.1
Frequency Distribution of Children with Myopia by Age

n=42

S.No	Age in years	No. of participants	
		Frequency	Percentage (%)
1	9 years	29	69.05
2	10 years	13	30.95

The above table reveals that, 29 (69.05%) children belong to the age group of 9 years and 13 (30.95%) children belong to the age group of 10 years (Figure 4.1).

Table 4.2
Frequency Distribution of Children with Myopia by Gender

n=42

S.No	Gender	No. of participants	
		Frequency	Percentage (%)
1	Male	20	47.61
2	Female	22	52.39

The above table reveals that 20 (47.61%) children were males and 22(52.39%) children were females. (Figure 4.2)

Table 4.3
Frequency Distribution of Children with Myopia by Education

n=42

S.No	Education	No. of participants	
		Frequency	Percentage (%)
1	4 th standard	14	33.33
2	5 th standard	28	66.67

Above table describes that 28(66.67%) children were studying in 5th standard and 14 (33.33%) children were studying in 4th standard. (Figure 4.3)

Figure 4.1
Distribution of Children with Myopia by Age

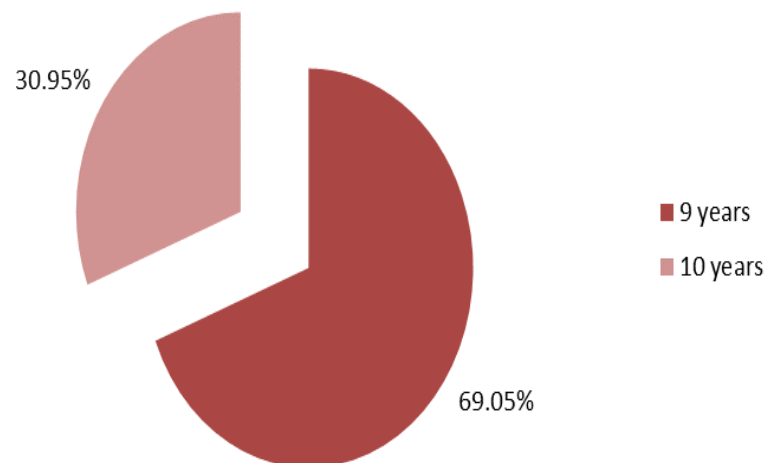


Figure 4.2

Distribution of Children with Myopia by Gender

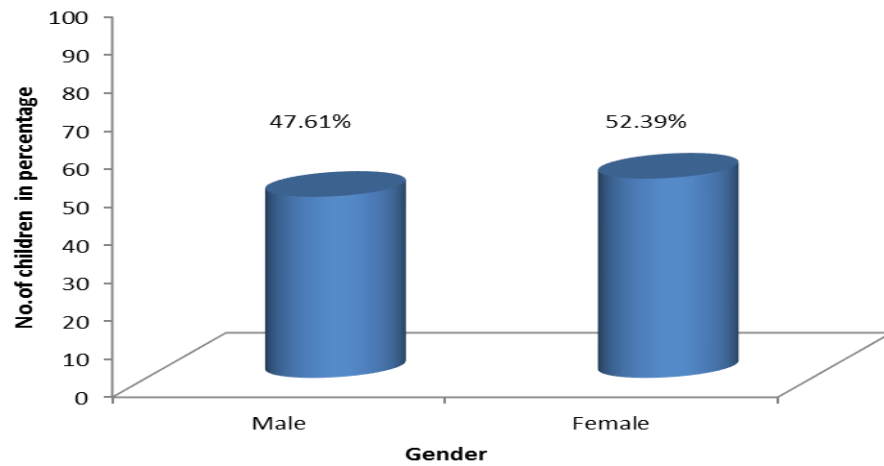


Figure 4.3

Distribution of Children with Myopia by Education

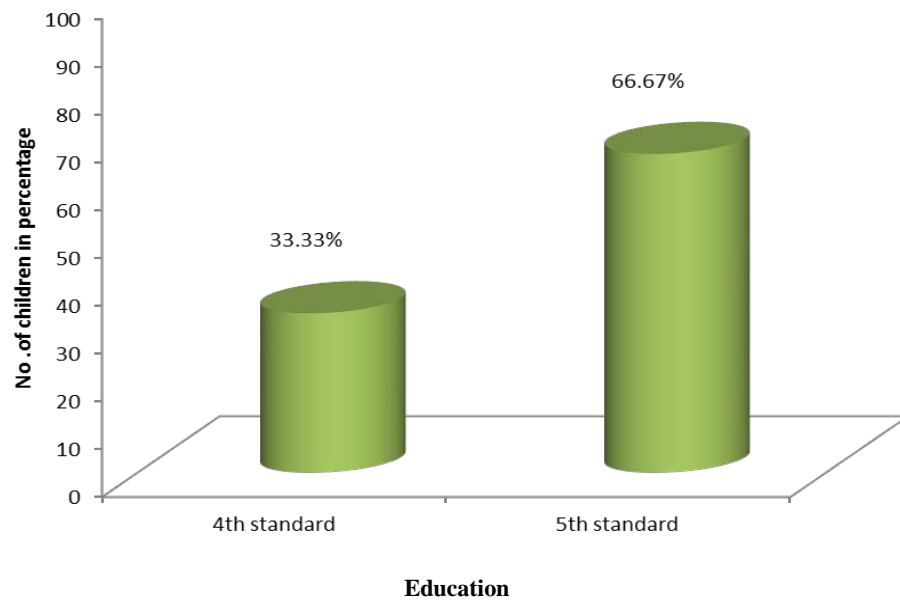


Table 4.4
Frequency Distribution of Children with Myopia Based on Hobbies

n=42

S.No	Hobbies	No. of participants	
		Frequency	Percentage (%)
1	Drawing	09	21.43
2	Dancing	06	14.28
3	Singing	01	02.39
4	Watching Television	06	14.28
5	Reading	07	16.67
6	No hobbies	13	30.95

The above table depicts that, 13 (30.95%) children had no hobbies, 9 (21.43%) were interested in drawing. 7 (16.67%) children had reading as hobby, 6 (14.28%) children were interested in dancing and another 6(14.28%) were interested in watching television and only one child (2.39%) had singing as hobby. (Figure 4.4)

Table 4.5
Frequency Distribution of Children with Myopia by Interested Games

n=42

S.No	Interested Games	No. of participants	
		Frequency	Percentage (%)
1	Indoor	02	04.76
2	Outdoor	36	85.72
3	Nil	04	09.52

The above table showed that, 36 (85.72%) children preferred outdoor games, while 2 (4.76%) children enjoyed indoor games. Remaining 4(9.52%) children were not interested in any of the games. (Figure 4.5)

Figure 4.4

Distribution of Children with Myopia Based on Hobbies

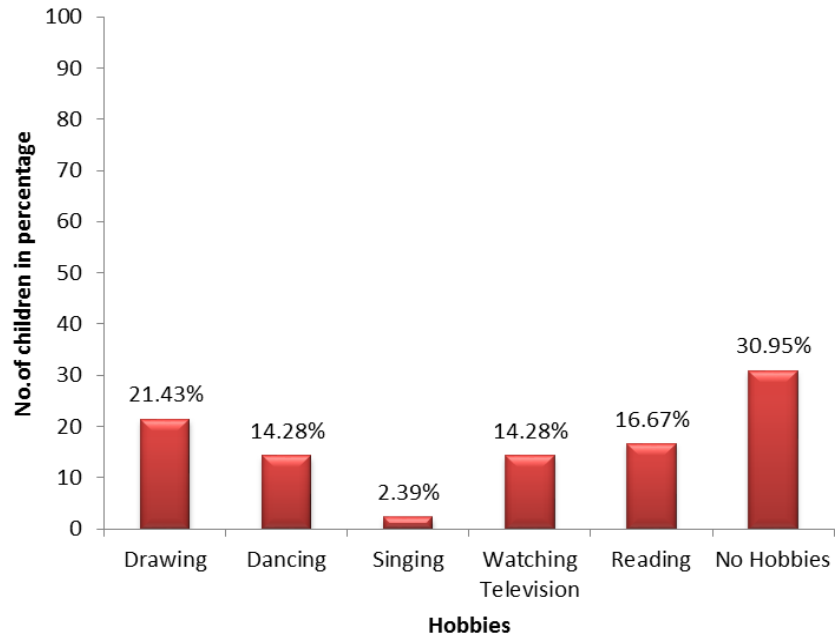


Figure 4.5

**Distribution of Children with Myopia
Based on Interested Games**

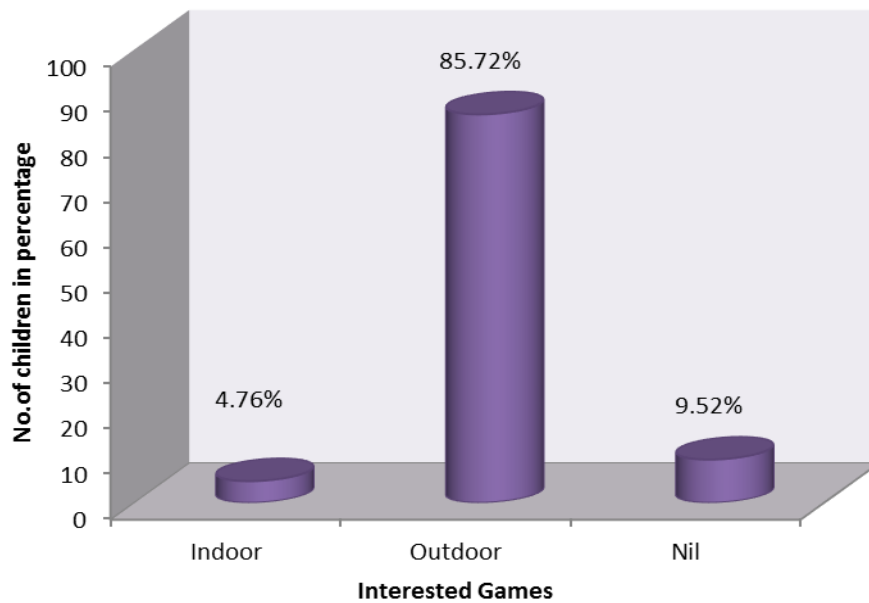


Table 4.6
Frequency Distribution on Parents of Children with Myopia

S.No	Demographic data	No. of participants			
		Father n=41		Mother n=42	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Age (in years)				
	25-35	05	12.2	26	61.91
	36-45	28	68.29	15	35.71
	46-55	08	19.51	01	2.38
2	Education of parents				
	Primary	01	2.43	06	14.29
	Middle school	04	9.76	04	09.52
	High school	24	58.53	19	45.24
	Higher secondary	04	9.76	04	09.52
	Under graduate	04	9.76	06	14.29
	Post graduate	04	9.76	03	07.14
3.	Occupation of parents				
	House wife	-	-	26	61.91
	Govt. sector	08	19.51	02	04.76
	Business	06	14.63	03	07.14
	Private	27	65.86	11	26.19
4	Wearing glass				
	Yes	11	26.83	18	42.86
	No	30	73.17	24	57.14

The above table explains that majority of the fathers 28 (68.29%) were between 36-45 years old whereas 26 (61.91%) mothers were between 25-35 years of age. It is found that, 24 (58.53%) fathers and 19 (45.24%) mothers finished high school education and 4 (9.76%) fathers and 3 (7.14%) mothers were post graduates. Majority 27 (65.86%) fathers had private jobs whereas most of the mothers 26 (61.91%) were housewives. 30 (73.17%) fathers and 24 (57.14%) mothers were not wearing glasses.

SECTION II

4.2 Information regarding the Vision and its Related Factors among Children with Myopia

This section deals with the data regarding the vision of the children. It included the number of years wearing glasses, knowledge on optical power, history of headache, duration of headache, history of eye infection, number of books read in a week, type of lighting used, number of hours watching television, distance of watching television and duration of computer usage.

Table 4.7
Frequency Distribution of Children with Myopia by Duration of
Wearing Glasses

n=42

S.No	No. of years wearing glasses	No. of participants	
		Frequency	Percentage (%)
1	Less than 1 year	08	19.05
2	1-3 years	32	76.19
3	More than 3 years	02	04.76

The above table depicts that, 32 (76.19%) children were using glasses for about 1 to 3 years, 8 (19.05%) children were using glasses for less than 1 year and 2(4.76%) children were wearing glasses for more than 3 years. (Figure 4.6)

Table 4.8
Frequency Distribution of Children with Myopia Based on Knowledge of
Optical Power

n=42

S.No	Knowledge of optical power	No. of participants	
		Frequency	Percentage (%)
1	Yes	09	21.43
2	No	33	78.57

The above table depicts that, majority 33 (78.57%) were not aware about the optical power and only 9 (21.43%) knew about the optical power. (Figure 4.7)

Figure 4.6
Distribution of Children with Myopia Based on Years of Wearing Glasses

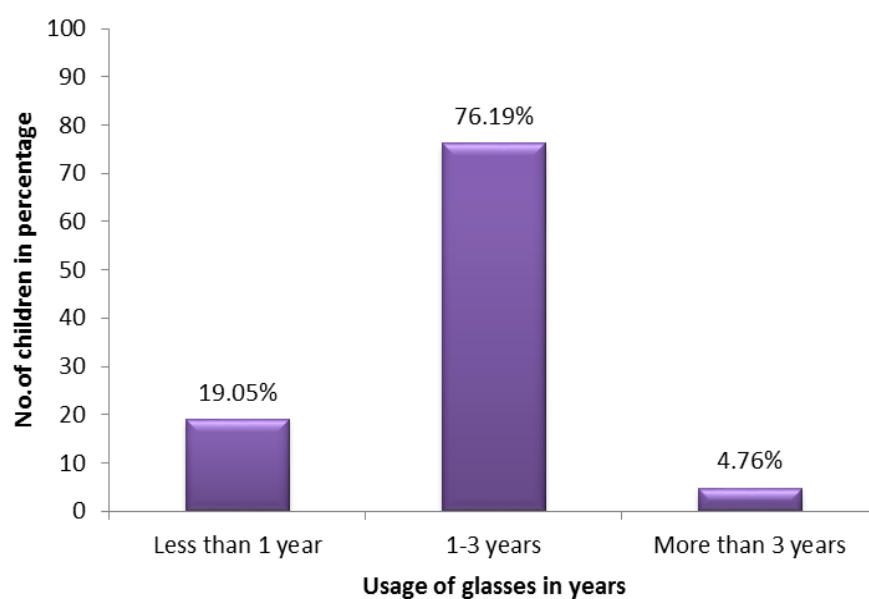


Figure 4.7
Distribution of Children with Myopia based on knowledge of optical power

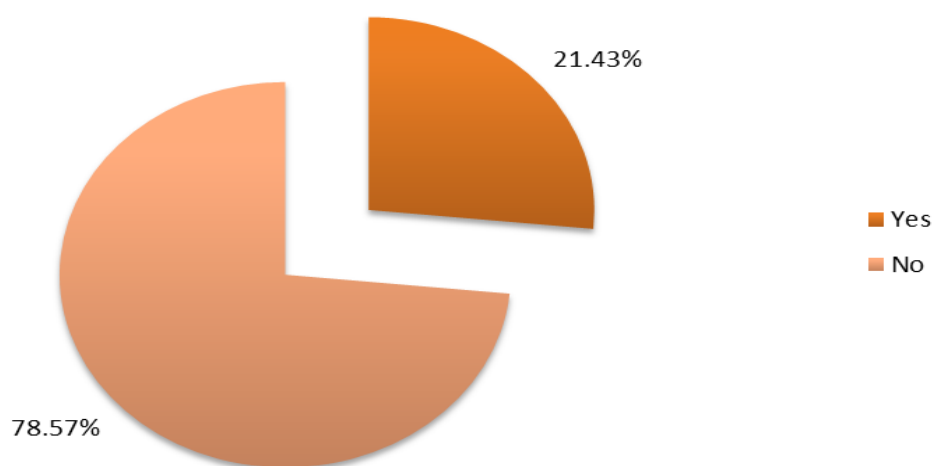


Table 4.9

Frequency Distribution of Children with Myopia based on the History of headache

n=42

S.No	History of headache when reading/doing home work	No. of participants	
		Frequency	Percentage (%)
1	Yes	16	38.09
2	No	26	61.91

The above table explains that 26 (61.91%) children did not have history of headache while reading or doing homework, whereas 16 (38.09%) had headache previously. (Figure 4.8)

Table 4.10

Frequency Distribution of Children with Myopia by Duration of Headache

n=16

S.No	Duration of headache	No. of participants	
		Frequency	Percentage (%)
1	5 -30 minutes	7	43.75
2	30-60 minutes	6	37.50
3	60-120 minutes	3	18.75

The above table reveals that, 7 (43.75 %) children had headache for 5-30 minutes, 6 (37.50%) children had headache for 30-60 minutes and 3(18.75%) had headache for 60-120 minutes. (Figure 4.9)

Figure 4.8
Distribution of Children with Myopia based on the History of Headache



Figure 4.9
Distribution of Children with Myopia by Duration of Headache

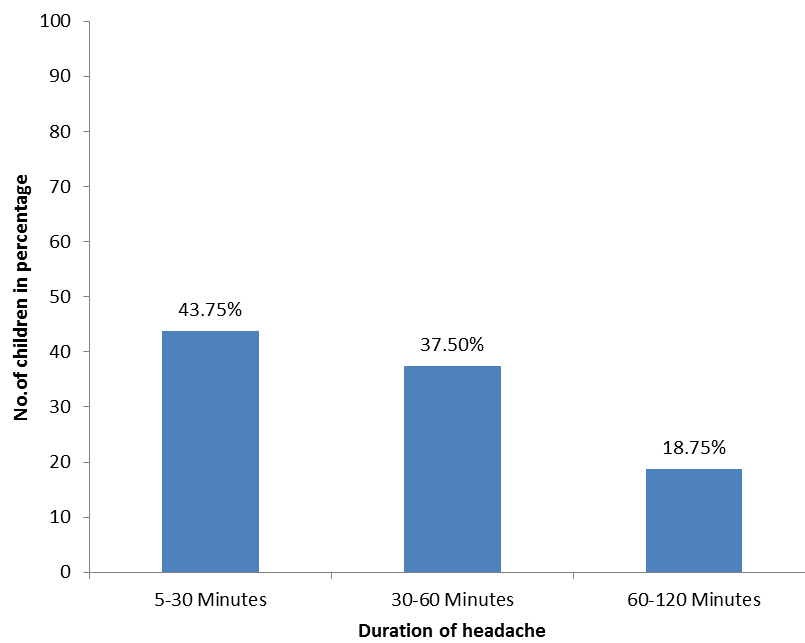


Table 4.11

Frequency Distribution of Children with Myopia by History of Eye Infection

n=42

S.No	History of eye infection	No. of participants	
		Frequency	Percentage (%)
1	Yes	07	16.67
2	No	35	83.33

The above table reveals that, majority, 35 (83.33%) children did not have any history of eye infection and only 7 (16.67%) children experienced eye infection before. (Figure 4.10)

Figure 4.10

Distribution of Children with Myopia Based on Eye Infection

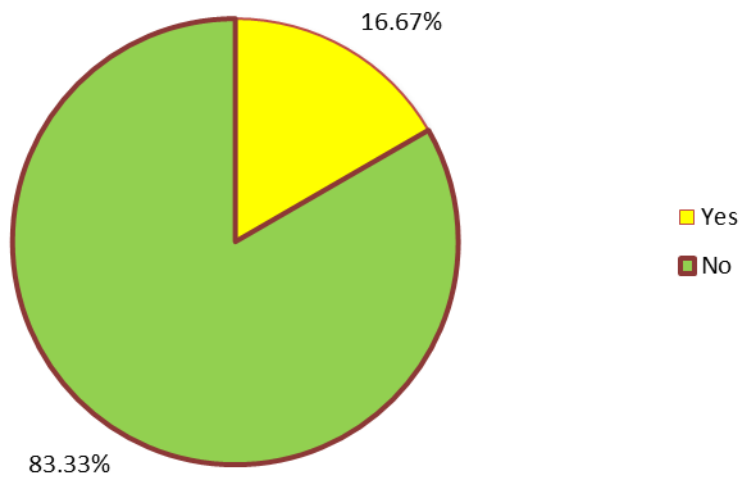


Table 4.12
Frequency Distribution of Children with Myopia Based on Number of Books
Read in a Week

n=42

S.No	No. of books or magazines read in a week	No. of participants	
		Frequency	Percentage (%)
1	1-5 Books	31	73.81
2	5-15 Books	10	23.81
3	15-20 Books	01	02.38

The above table reveals that, 31 (73.81%) children were reading 1 to 5 books per week, 10 (23.81%) children read 5 to 15 books in a week and 1 (2.38%) child read nearly 15 to 20 books in a week. (Figure 4.11)

Table 4.13
Frequency Distribution of Children with Myopia Based on the Type of
Lighting used for Reading and Writing

n=42

S.No	Type of lighting used for reading and writing	No. of participants	
		Frequency	Percentage (%)
1	Tube light	40	95.24
2	Bulb	02	04.76

The above table explains that, majority 40 (95.24%) children used tube light for reading and writing, while 2 (4.76%) children were using bulb. (Figure 4.12)

Figure 4 .11

Distribution of Children with Myopia by Number of Books Read in a Week

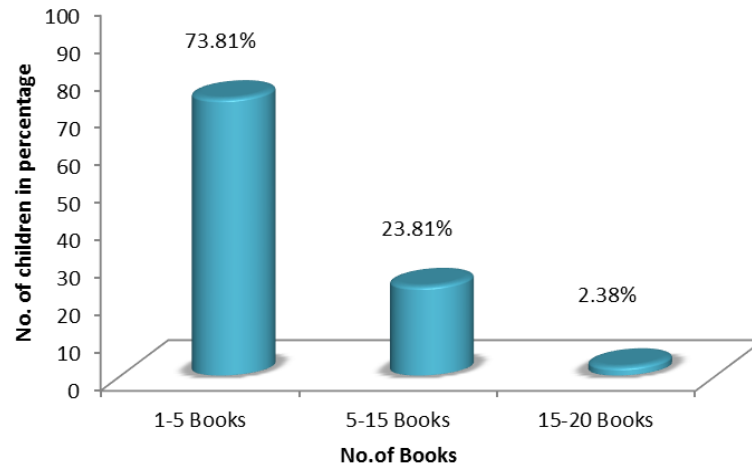


Figure 4.12

Distribution of Children with Myopia by Type of Lighting used for Reading and Writing

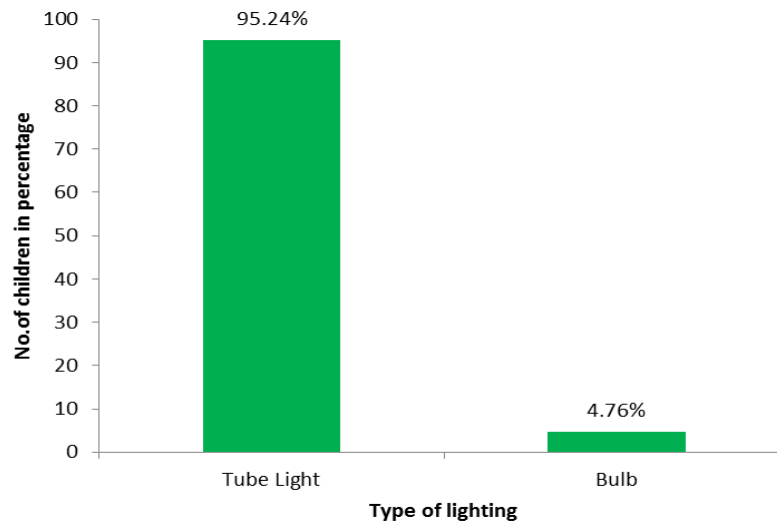


Table 4.14

**Frequency Distribution of Children with Myopia based on
Number of Hours watching Television**

n=42

S.No	No. of hours watching television	No. of participants	
		Frequency	Percentage (%)
1	Less than 1 Hr	03	07.14
2	1-3Hrs	29	69.05
3	More than 3 hours	10	23.81

The above table depicts that, 29 (69.05%) children spent 1 to 3 hours for watching television, 10 (23.80%) children watched television for more than 3 hours and only 3 (7.14%) children spent less than 1 hour. (Figure 4.13)

Figure 4.13

**Distributions of Children with Myopia Based on Number of
Hours watching television**

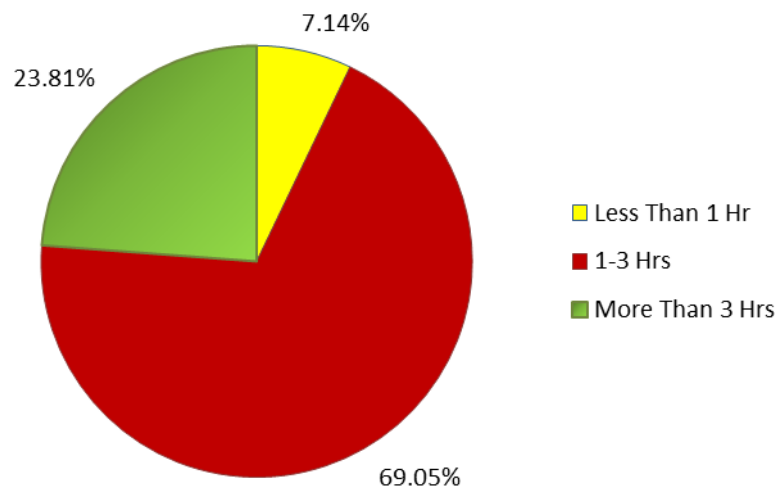


Table 4.15
Frequency Distribution of Children with Myopia Based on Distance of watching television

n=42

S.No	Distance of watching television	No. of participants	
		Frequency	Percentage (%)
1	1-5 feet	16	38.10
2	5-10 feet	14	33.33
3	10-15 feet	12	28.57

The above table shows that, 16 (38.09%) children watch television from a distance of 1 to 5 feet, whereas 14 (33.33%) children watch television at a distance of 5-10 feet and 12 (28.57%) children watched at a distance of 10 to 15 feet respectively. (Figure 4.14)

Table 4.16
Frequency Distribution of Children with Myopia Based on Duration of Computer Usage

n=42

S.No	Duration of computer usage	No. of participants	
		Frequency	Percentage (%)
1	No usage	30	71.43
2	Less than 1 Hr	06	14.29
3	1-3 Hrs	05	11.90
4	More than 3 Hrs	01	02.38

The above table describes that, 30 (71.43%) children were not using computer, 6 (14.29%) children use computer for less than 1 hour, 5 (11.90%) children use for 1-3 hours and only 1(2.38%) child use computer for more than 3 hours. (Figure 4.15)

Figure 4.14
Distribution of Children with Myopia based on Distance of Watching
Television

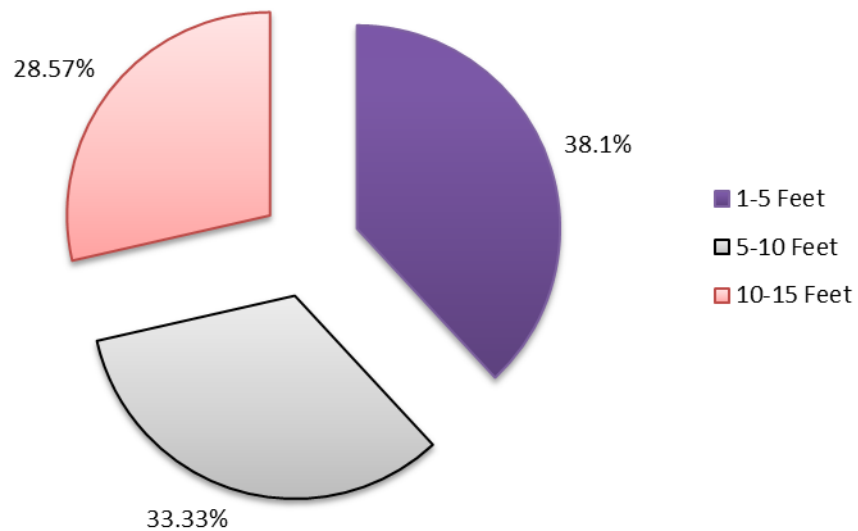
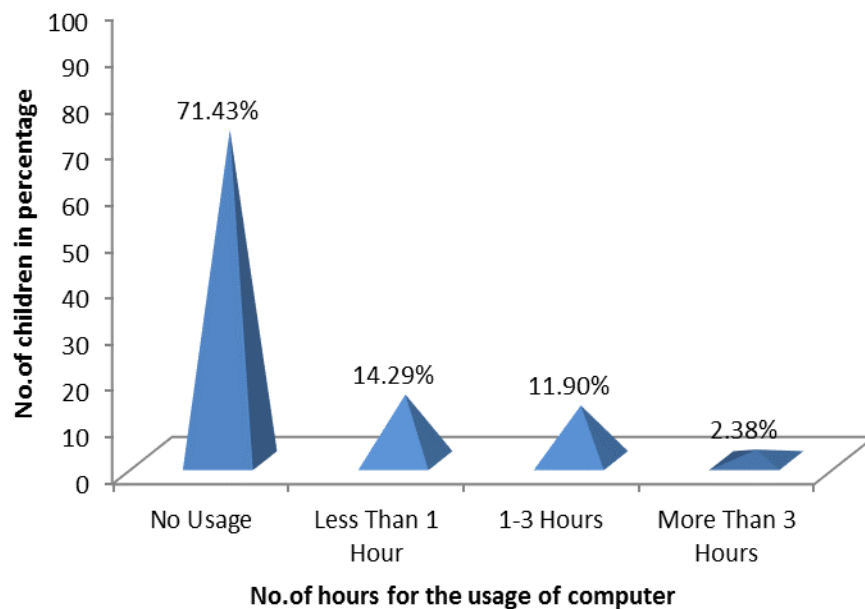


Figure 4.15
Distribution of Children with Myopia Based on Duration of Computer Usage



SECTION III

4.3 Assessment on Level of Visual Acuity Among Children With Myopia

This section deals with the Assessment on level of visual acuity among children with myopia in selected schools of Coimbatore. The data was analyzed using descriptive statistics.

This section is presented under the following headings

1. Level of Visual Acuity among Children with Myopia before intervention
2. Level of myopia among children before intervention

Table 4.17

Level of Visual Acuity among Children with Myopia before Intervention

n=42

S.No	Visual Acuity(meters)	No. of Participants			
		Right Eye		Left Eye	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	6/60	0	0	0	0
2	6/36	05	11.90	03	07.14
3	6/24	08	19.05	07	16.67
4	6/18	11	26.20	11	26.19
5	6/12	08	19.05	06	14.29
6	6/9	05	11.90	10	23.81
7	6/6	05	11.90	05	11.90

The above table shows the distribution of children based on visual acuity of right and left eye. In the right eye, 11(26.20%) children had the visual acuity of 6/18 and 8 (19.05%) children had the visual acuity of 6/24 and 6/12 respectively. Moreover, 5 (11.90%) children had visual acuity of 6/36, 5 had 6/9 and another 5 had visual acuity of 6/6. No one had visual acuity of 6/60 among them.

In the left eye, 11 (26.19%) children had visual acuity of 6/18, 10(23.81%) children had 6/9, 7 (16.67%) children had 6/24 level of visual acuity. There were 6 (14.29%) children with visual acuity of 6/12, 5 (11.90%) children had 6/6 level of visual acuity and 3(7.14%) children had the visual acuity of 6/36. No one had visual acuity of 6/60 among them.

Table 4.18
Level of Myopia among Children before Intervention

n=42

S.No	Level of myopia	No. of Participants			
		Right Eye		Left Eye	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Normal	05	11.91	05	11.91
2	Low	24	57.14	27	64.28
3	High	13	30.95	10	23.81

The table shows that, in the right eye 24 (57.14%) children had low myopia, 13 (30.95%) children had high myopia and 5 (11.91%) children had normal visual acuity. In the left eye 27 (64.28%) had low myopia, 10 (23.81%) had high myopia and 5 (11.91%) children had normal visual acuity.

SECTION IV

4.4 Effect Of Bates Exercise On Visual Acuity Among Children With Myopia

This section deals with analysis and interpretation of the effect of bates exercise on visual acuity among children with myopia. The pretest score obtained was tabulated in the master data sheet and total score obtained by each respondent was calculated.

The difference in scores before and after Bates exercise was analyzed using paired 't' test. The significant mean difference on statistical analysis will reveal the effect of Bates exercise on visual acuity among the children with myopia.

This section is presented under the following headings.

1. Level of Visual Acuity among Children with Myopia after intervention.
2. Level of myopia among children after intervention.
3. Effect of Bates exercises on Visual Acuity among Children with Myopia.

Table 4.19**Level of Visual Acuity among Children with Myopia after Intervention**

n=42

S.No	Visual Acuity(meters)	No. of Participants			
		Right Eye		Left Eye	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	6/60	0	0	0	0
2	6/36	0	0	0	0
3	6/24	04	09.52	03	07.14
4	6/18	12	28.57	12	28.57
5	6/12	06	14.29	05	11.91
6	6/9	04	09.52	09	21.43
7	6/6	16	38.10	13	30.95

The table shows the level of visual acuity of right and left eye. Results showed that, in right eye, majority 16 (38.10%) children had normal visual acuity, 12 (28.57%) children had visual acuity of 6/18, 6 (14.3%) children had visual acuity of 6/12 and 4 (9.52%) children had the visual acuity of 6/24 and 6/9 in each level respectively.

In left eye, 13 (30.95%) children had visual acuity of 6/6, 12 (28.57%) children had visual acuity of 6/18 and 9 (21.43%) children had visual acuity of 6/9. 5 (11.91%) children had visual acuity of 6/12 and only 3 (7.14%) children had visual acuity of 6/24. No one had visual acuity of 6/60 and 6/36 in both eyes.

Table 4.20
Level of Myopia among Children after Intervention

n=42

S.No	Level of myopia	No. of Participants			
		Right Eye		Left Eye	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Normal	16	38.10	13	30.95
2	Low	22	52.38	26	61.91
3	High	04	09.52	03	07.14

The table shows that, in the right eye 22 (52.38%) children had low myopia, 4 (9.52%) children had high myopia and 16 (38.10%) children had normal visual acuity. In the left eye 26 (61.91%) had low myopia, 3 (7.14%) had high myopia and 13 (30.95%) children had normal visual acuity after Bates exercise.

Table 4.21
Effect of Bates Exercise on Visual Acuity among Children with Myopia

n=42

Eye	Test	Mean	SD	Mean Difference	Paired 't' Value
Right	Before Intervention	4.35	1.51	1.05	6.42***
	After Intervention	5.40	1.35		
Left	Before Intervention	4.67	1.33	0.76	4.86***
	After Intervention	5.43	1.53		

*** Significant at 0.001 level

Paired t' test was used to assess the effect of Bates exercise on visual acuity. On the right eye, the mean score of visual acuity before and after Bates exercise was 4.35 and 5.40 respectively with a mean difference of 1.05 and the calculated 't' value is 6.418 which is greater than the table value at 0.001 level of significance.

On the left eye of the children with myopia, the mean score of visual acuity before and after bates exercise was 4.67 and 5.43 respectively with a mean difference of 0.76. The calculated 't' value is 4.858 which is greater than the table value at 0.001 level of significance.

Both the 't' values in right and left eye are found to be significant at 0.001 level. Thus the research hypothesis, ' There will a significant difference in visual acuity among children before and after administering Bates exercise' was accepted at 0.001 level of significance.

SECTION V

4.5 Association between Level of Myopia and Selected Variables of Children with Myopia

Chi square test (with Yates correction) was used to assess the association between level of myopia and selected variables like age, sex, education, games, and number of books read in a week, number of hours of watching television, hours of computer usage and number of parents wearing glasses.

Table 4.22
Association between Level of Myopia in the Right Eye with Selected Demographic Variables Before Intervention

(n=42)

Demographic Variable	Category	Sample	Student level of myopia in right eye			χ^2 value	Degree of freedom	χ^2 table value
			Normal	Low	High			
Age	9 years	13	3	9	1	0.013	2	5.99
	10 years	29	2	16	11			
Gender	Male	20	2	16	2	0.02	2	5.99
	Female	22	3	9	10			
Education	4 th standard	14	3	9	2	0.006	2	5.99
	5 th standard	28	2	16	10			
Wearing Glasses - Father	Yes	11	1	6	4	0.006	2	5.99
	No	30	3	19	8			
Wearing Glasses - Mother	Yes	18	3	12	3	0.005	2	5.99
	No	24	2	13	9			

Table 4.22 shows the association of the selected demographic variables and the level of myopia in the right eye among children with myopia. It was found that there is no significant association between age, gender, education and the parents usage of glasses and the level of myopia in the right eye among children with myopia.

Table 4.23

**Association Between Level Of Myopia In The Right Eye With Selected
Variables Related To Vision Before Intervention**

(n=42)

Demographic Variable	Category	Sample	Student level of myopia in right eye			χ^2 value	Degree of freedom	χ^2 table value
			Normal	Low	High			
Number of Books read in a week	1-5 feet	31	4	18	9	0.006	4	9.49
	5-15 feet	10	1	6	3			
	15-20 feet	1	0	1	0			
Games	Indoor	2	0	2	0	0.006	4	9.49
	Outdoor	36	4	20	12			
	Nil	4	1	3	0			
No. of hours watching TV	Less than 1 hour	3	0	1	2	0.005	4	9.49
	1-3 hours	29	4	15	10			
	More than 3 hours	10	1	9	0			
Distance for watching TV	1-5 feet	16	1	12	3	0.005	4	9.49
	5-10 feet	14	3	6	5			
	10-15 feet	12	1	7	4			
Duration of Computer usage	No usage	30	4	18	8	0.005	6	12.6
	Less than 1 hour	6	0	3	3			
	1-3 hours	5	1	3	1			
	More than 3 hours	1	0	0	1			

Table 4.23 shows the association of the selected demographic variables and the level of myopia in the right eye among children with myopia. It was found that there is no significant association between number of book read in a week, games, number of hours watching TV, distance for watching TV, duration of computer usage and the level of myopia in the right eye among children with myopia.

Table 4.24
Association Between Level Of Myopia In The Left Eye And
Selected Demographic Variables Before Intervention

(n=42)

Demographic Variable	Category	Sample	Student level of myopia in left eye			χ^2 value	Degree of freedom	χ^2 table value
			Normal	Low	High			
Age	9 years	13	3	9	1	0.005	2	5.99
	10 years	29	2	19	8			
Gender	Male	20	4	12	4	0.005	2	5.99
	Female	22	1	16	5			
Education	4 th standard	14	3	9	2	0.005	2	5.99
	5 th standard	28	2	19	2			
Wearing Glasses – Father	Yes	11	0	9	2	0.005	2	5.99
	No	30	4	19	7			
Wearing Glasses - Mother	Yes	18	2	14	2	0.005	2	5.99
	No	24	3	14	7			

Table 4.24 shows that there is no significant association between the selected demographic variables such as age, gender, education, parent's usage of glasses and the level of myopia in the left eye among children with myopia.

Table 4.25
Association Between Level Of Myopia In The Left Eye And
Selected Variables Before Intervention

(n=42)

Demographic Variable	Category	Sample	Student level of myopia in left eye			χ^2 value	Degree of freedom	χ^2 table value
			Normal	Low	High			
Books reading in a week	1-5 feet	31	4	21	6	0.005	4	9.49
	5-15 feet	10	1	7	2			
	15-30 feet	1	0	0	1			
Interested Games	Indoor	2	0	2	0	0.005	4	9.49
	Out door	36	4	20	12			
	nil	4	1	3	0			
No. of hours watching TV	<1 hour	3	0	2	1	0.002	4	9.49
	1-3 hour	29	3	20	6			
	>3 hour	10	2	6	2			
Distance for watching TV	1-5 feet	16	4	6	6	0.005	4	9.49
	5-15 feet	14	1	11	2			
	15-20 feet	12	0	11	1			
Computer usage	No usage	30	3	22	5	0.002	6	12.6
	Less than 1 hour	6	1	2	3			
	1-3 hours	5	1	4	0			
	More than 3 hours	1	0	0	1			

Table 4.25 shows that there is no significant association between the selected demographic variables such as number of book read in a week, games, number of hours watching TV, distance for watching TV, duration of computer usage and the level of myopia in the left eye among children with myopia.

RESULTS AND DISCUSSION

This chapter deals with the interpretation of the results and discussion of the findings. The main aim of the study was to assess the effect of Bates exercise on visual acuity among children with myopia at selected schools. The study was conducted in CMS primary school, PSG Primary School, Shri Vijayavidhyalaya and Rasakondalar School, Coimbatore. The findings are discussed based on the objectives of the study and it is described under the following headings.

5.1 Demographic details of children with Myopia

In the present study, 42 samples were included. The age distribution reveals that, majority 29 (69.05%) children belong to the age group of 9 years and 13 (30.95 %) were 10 years. Data on gender reveals that, 20 (47.61%) children were Male and 22 (52.39%) were Female. Data on education reveals that majority 28 (66.67%) children belong to 5th standard and 14 (33.33%) belong to 4th standard. Data regarding hobbies reveals that, 13 (30.95%) children had no hobbies, 9 (21.43%) were interested in drawing. 7 (16.67%) children had reading as hobby, 6 (14.28%) children were interested in dancing and another 6 (14.28%) children were interested in watching television and only one child (2.39%) had singing as hobby. Majority 36 (85.72%) preferred outdoor games, while 2 (4.76%) enjoyed indoor games. Remaining 4(9.52%) children were not interested in any of the games.

Data regarding parents showed that, majority of the fathers 28 (68.29%) were between 36-45 years old whereas 26 (61.91%) mothers were between 25-35 years of age. It is found that, 24 (58.53%) fathers and 19 (45.24%) mothers finished high school education and 4 (9.76%) fathers and 3 (7.14%) mothers were post graduates. Majority 27 (65.86%) fathers had private jobs whereas 26 (61.91%) mothers were housewives. 30 (73.17%) fathers and 24 (57.14%) mothers were not wearing glasses.

5.2 Information regarding the Vision and its Related Factors among Children with Myopia

Data regarding wearing glasses depicts that, 32 (76.19%) children were using glasses for about 1 to 3 years, 8 (19.05%) children were using glasses for less than 1 year and 2 (4.76%) children were wearing glasses for more than 3 years.

Data regarding their knowledge on optical power depicts that, Majority 33 (78.57%) were not aware about the optical power and only 9 (21.43%) knew about the optical power. 26 (61.91%) children did not have the history of headache while reading or doing homework, whereas 16 (38.09%) had headache previously. The duration of headache reveals that 7 (43.75 %) children had headache for 5-30 minutes, 6 (37.50%) had headache for 30-60 minutes and 3 (18.75%) children had headache for 60-120 minutes.

Data regarding history of eye infection reveals that, majority 35(83.33%) children were not having the history of eye infection and only 7 (16.67%) of them experienced eye infection. Data on number of books read by the children reveals that, 31 (73.81%) of them read 1 to 5 books per week whereas only 1 (2.38%) child read 15 to 20 books in a week and 10 (23.81%) children read nearly 5 to 15 books.

Type of lighting used shows that majority 40 (95.24%) of them used tube light for reading and writing, while 2 (4.76%) children were using bulb. 29 (69.05%) children spent 1 to 3 hours for watching television, 10 (23.81%) of them watch television for more than 3 hours and only 3 (7.14%) children spent less than 1 hour. Distance for watching television shows that 16 (38.10%) children watch television from a distance of 1 to 5 feet, 14 (33.33%) and 12 (28.57%) children watch television at a distance of 5 to 10 feet and 10 to 15 feet respectively. Data regarding duration of computer usage shows that, 30 (71.43%) children were not using computer, 6 (14.29%) children use computer for less than 1 hour, 5 (11.90%) children use for 1-3 hours and only 1(2.38%) child use computer for more than 3 hours.

5.3 Objective 1: Assess the Level of Visual Acuity among Children with Myopia

Among 42 children, in the right eye, 11(26.20%) children had the visual acuity of 6/18, 8 (19.05%) children had the visual acuity of 6/24 and another 8 (19.05%) children had the visual acuity of 6/12. Moreover, 5 (11.90%) children had visual acuity of 6/36, 5 (11.90%) children had visual acuity of 6/9 and another 5 (11.90%) children had visual acuity of 6/6. No one had visual acuity of 6/60 among them.

In the left eye, 11 (26.19%) children had visual acuity of 6/18, 10 (23.81%) children had 6/9, 7 (16.67%) children had 6/24 level of visual acuity. There were 6 (14.29%) children with visual acuity of 6/12, 5 (11.90%) children had 6/6 level of visual acuity and 3(7.14%) children had the visual acuity of 6/36. No one had visual acuity of 6/60 among them.

Based on the level of myopia, 24 (57.14%) children had low myopia in right eye and 27 (64.28%) in left eye. 13 (30.95%) children had high myopia in the right eye and 10(23.81%) children had high myopia in the left eye. 5(11.91%) children had normal visual acuity in right eye and another 5 (11.91%) children had normal visual acuity in left eye .

5.4 Objective 2: Evaluate the Level of Visual Acuity Among Children with Myopia After Administering Bates Exercise.

After checking the visual acuity among children with myopia, Bates exercise was administered twice a day for 4 weeks. Intervention was carried out once by the Researcher in the school. The samples were asked to continue the same exercise at home under the supervision of the parents.

5.4.1. Level of Visual Acuity among Children with Myopia after Intervention

In right eye, majority 16 (38.10%) children had normal visual acuity , 12 (28.57%) children had visual acuity of 6/18, 6 (14.29%) children had visual acuity of 6/12 and 4 (9.52%) children had the visual acuity of 6/24 and 6/9 in each level respectively.

In left eye 13 (30.95%) children had visual acuity of 6/6, 12 (28.57%) children had visual acuity of 6/18 and 9 (21.43%) children had visual acuity of 6/9. 5 (11.91%) children had visual acuity of 6/12 and only 3 (7.14%) children had visual acuity of 6/24. No one had visual acuity of 6/60 and 6/36 in both eyes.

Among 42 children, in the right eye 22(52.38%) had low myopia, 16 (38.10%) had normal vision and only 4(9.52%) children had high myopia whereas in the left eye 26 (61.91%) children had low myopia, 13(30.95%) children had normal vision and only 3 (7.14%) had high myopia after Bates exercise.

These findings were similar to a study conducted by Berens et al (2012) on visual training in 80 patients with low myopia; the control group consisted of 60 patients. They reported that 74 of 80 (92.5%) patients improved in terms of subjective visual acuity as measured on visual acuity charts while 59 of 60 (98%) patients in the control group lost visual acuity. This difference was statistically significant and patients in the treatment group improved visual acuity than the control group.

5.4.2. Effect of Bates Exercise on Visual Acuity

Paired t' test was used to assess the effect of Bates exercise on visual acuity. On the right eye, the mean score of visual acuity before and after bates exercise was 4.35 and 5.40 respectively with a mean difference of 1.05 and the calculated 't' value is 6.418 which is greater than the table value at 0.001 level of significance.

On the left eye of the children with myopia, the mean score of visual acuity before and after bates exercise was 4.67 and 5.43 respectively with a mean difference of 0.76. The calculated 't' value is 4.858 which is greater than the table value at 0.001 level of significance.

Both the 't' values in right and left eye are found to be significant at 0.001 level. Thus the research hypothesis, 'There will be a significant difference in visual acuity among children before and after administering Bates exercise' was accepted at 0.001 level of significance.

These findings were similar to a study conducted by Mohamed Abdel (2013) to investigate the effectiveness of specifically designed eye exercises program on myopia control for Saudi female adolescents. The results revealed a significant improvement of visual acuity in both right ($p=0.028$) and left eyes ($p=0.020$) indicating that eye exercises as vision therapy-based program could improve visual acuity for female adolescents with myopia.

5.5 Association between the Level of Myopia and the Selected Variables of Children with Myopia

Chi square test was used to assess the association between level of myopia and the selected variables. The results shows that there is no significant association between level of myopia in both the eyes with the selected demographic variables like age, gender, education, parents usage of glasses and other variables like books read in a week, games, number of hours of watching television, distance for watching television and duration of computer usage .

A study done by Rose and Morgan (2008) on outdoor activity and prevalence of myopia showed that, higher levels of outdoor activity were associated with low myopia prevalence. But the present study showed no association between outdoor and indoor games and level of myopia.

One more study conducted by Taylor et al (2008) to determine the factors of myopia showed that there is a link between parental myopia, IQ scores and subsequent myopia development and it is not associated with reading books per week. The present study also showed that, books read per week was not associated with levels of myopia.

A study done by Vashisht and Meenakshi (2008) on prevalence of refractive errors in school children. The result showed that out of 1265, seventeen children were found to have defective vision (less than 6/9), 1.74% of students have one eye affected where as 10.36% have both eye affected. The prevalence of myopia, hyperopic or astigmatism was more in girls compared to boys. But in the present study, results showed that there is no association between the level of myopia and gender.

SUMMARY AND CONCLUSION

This chapter summarizes the major findings, limitations, recommendations and implications in the field of nursing education, nursing administration, nursing practice, and nursing research.

The study was conducted to assess the effect of Bates exercise on level of visual acuity among children with myopia in four schools situated in Coimbatore. A pre experimental, one group pretest post-test design was adopted for the study. Purposive sampling technique was used to select the samples and a total number of samples selected for the study were 42. Initially the level of visual acuity was measured using Snellen chart before intervention. The intervention was given for 30 days and the level of visual acuity was reassessed using Snellen chart after 30 days. Paired 't' test was used to find out the effect of Bates exercises on visual acuity among children with myopia. The findings from the study concluded that, Bates exercise was effective in improvement of level of visual acuity among children with myopia.

6.1. Major Findings of the Study

- 6.1.1. In the present study, 42 samples were included. Majority 29 (69.05%) children belong to the age group of 9 years. 22 (52.39%) children were Females, 28(66.67%) children belong to 5th standard. 13 (30.95%) children had no hobbies and 36 (85.72%) preferred outdoor games.
- 6.1.2. Data regarding parents showed that majority of the fathers 28 (68.29%) were between 36-45 years whereas 26 (61.91%) mothers were between 25-35 years of age. It is found that 24 (58.53%) fathers and 19 (45.24%)

mothers finished higher secondary education and 4 (9.76%) fathers and 3 (7.14%) mothers were post graduates. Majority 27 (65.86%) fathers had private jobs and most of the mothers 26 (61.91%) were housewives. 30 (73.17%) fathers and 24 (57.14%) mothers were not using glasses.

- 6.1.3. Data regarding the vision of children depicts that 32 (76.19%) children were using glasses for about 1 to 3 years. 33 (78.57%) knew the optical power. 26 (61.91%) did not have the history of headache while reading or doing homework, 7 (43.75 %) children had headache for 5-30 minutes. 35 (83.33%) children were not having the history of any eye infection before and 31 (73.81%) children read 1 to 5 books per week.

40 (95.24%) children used tube light for reading and writing, 29 (69.05%) children spent 1 to 3 hours for watching television. 16 (38.10%) children watched television from a distance of 1 to 5 feet and 30 (71.43%) children were not using computer.

- 6.1.4. Among 42 children, before Bates exercise in the right eye, 11(26.20%) had the visual acuity of 6/18, whereas no one had the visual acuity of 6/60. Based on the level of myopia, majority, 24(57.14%) children had low myopia in right eye.

In the left eye 11(26.19%) children had visual acuity of 6/18 and no one had the level of 6/60. Based on the level of myopia, majority, 27(64.28%) children had low myopia in left eye

- 6.1.5. After intervention, in the right eye, 16(38.10%) had the visual acuity of 6/6, whereas no one had the visual acuity of 6/60 and 6/36. Based on the level of myopia, majority, 22(52.38%) children had low myopia in right eye after Bates exercise.

In the left eye 13 (30.95%) children had visual acuity of 6/6 and no one had the level of 6/60 and 6/36. Based on the level of myopia, majority, 26(61.91%) children had low myopia in left eye after Bates exercise.

6.1.6. Paired 't' test was used to assess the effect of bates exercises on level of visual acuity among children with myopia. On the right eye, the mean score of visual acuity before and after bates exercise was 4.35 and 5.40 respectively with a mean difference of 1.05 and the calculated 't' value is 6.418. On the left eye of the children with myopia, the mean score of visual acuity before and after bates exercise was 4.67 and 5.43 respectively with a mean difference of 0.76. The calculated 't' value is 4.858 for the left eye. Both the 't' values in right and left eye are found to be significant at 0.001 level.

6.1.7. There is no significant association between the selected variables and the level of myopia among children with myopia.

6.2. Limitations

6.2.1. The study was limited to only 4 selected schools hence the possibility for wider generalization is limited.

6.2.2 Study could not be generalized since purposive sampling was adopted.

6.2.3 The intervention given at home was not supervised by the researcher.

6.3. Recommendation

6.3.1 The study can be replicated with a larger size of sample for wider generalization of findings.

6.3.2 A similar study can be conducted to determine the effect of bates exercise on level of visual acuity with control group.

6.3.3 A comparative study can be conducted on holistic healing technique like aroma therapy and Bates exercise for improving visual acuity among children with myopia.

6.4. Nursing Implications

6.4.1. Nursing Education

Myopia is a condition in which distant objects are not displayed sharply in the retina behind the optical system of the eye because the rays converge before they hit the retina. Children with myopia have visual acuity below normal and their visual acuity worsens or myopia progress as they grow older. The techniques used to improve the visual acuity are Bates exercise, bio feedback visual training, aroma therapy and Chinese eye exercises. In the field of nursing education the administration of Bates exercise is shown to be effective and it is appropriate to incorporate Bates exercise into nursing curriculum.

6.4.2. Nursing Administration

The district public health nurse can put down policies for identifying myopia among school children and encouraging continuing education to sharpen the skills in bates eye exercises. The school health nurse should be trained to do the Bates exercise among children with myopia to improve the visual acuity.

6.4.3. Nursing Practice

Nursing consists of a body of knowledge that is always changing with new innovations. Integration of innovations into nursing practice improves the quality of care provided to pediatric population. The ophthalmic nurses should be trained to do Bates exercise for the improvement in the level of visual acuity among children with myopia. Since many children were left undiagnosed and untreated, school health nurses can apply the knowledge in early identification and treatment of children with myopia in order to make them actively participate in the society.

6.4.4. Nursing Research

The nursing research need to focus more on the evidence based practice by understanding the various therapies that can bring about significant positive improvement in visual acuity among children with myopia. Since there is limited evidence, bates eye exercise have its effect on visual acuity of children with myopia should be encouraged among researcher to draw firm conclusions. So more evidenced based studies should be promoted based on this.

6.5. Conclusion

Myopia refers to a vision problem that enables a person to see things near the eyes clearly but objects far appear blurred. Since there is more incidence of myopia among children, parents seek interventions other than wearing spectacles as this hinder the comfort of doing their daily activities and improve their life style. The researcher adopted Bates exercises to improve the visual acuity of children with myopia. The result revealed with the evidence that Bates exercise brings substantial improvement in the child's visual acuity.

REFERENCES

1. Ahmed,I., and Mian,S. (2001). Prevalence of myopia in students of Srinagar city of Kashmir. Retrieved from website: web med.
2. American optometric association (2005) Are eye exercises of any value retrieved from www.allaboutvision.com
3. Bailey,G.(2014, June). Myopia (Nearsightedness). Retrieved from website: <http://www.allaboutvision.com/conditions/myopia.htm>.
4. Bambridge,A. (2002). Approaching myopia holistically: A case study and theoretical exploration. *The journal of alternative and complementary medicine*, 371-377.
5. Bates,W.H.(1913, August). Myopia Prevention by Teachers. *New York Medical Journal*.
6. Bates,W.H.(2009, July). The prevention of Myopia in School Children. *New York Medical Journal*.
7. Batra,N. (2007). Refractive errors in school children: A review from Punjab, NPCB India, volume 1, 1-8.
8. Berens, C., Girard, L .J., Fonda,G., and Sells, S.B. (2012). Effects of tachistoscopic training on visual functions in myopic patients. *American Journal of Ophthalmology* , (44), 25-47.
9. Beresford, S. M., David., and Tableman,M. (2005). Clinical evaluation of see clearly method. *The Journal of the Optometric Association*, VOL.83, 372-386.

10. Borish and Duke.(2014, March). Myopia ,types causes Retrieved from website: www.news-medical.net/health
11. Boxer,B.S., Balliet, R., Clay, A., Emile. (2013). The training of visual acuity in myopia. *Journal of American Optometric Association*. (53), 719-724.
12. Census of India. (2002). Population of Indian states & Union territories, Retrieved from <http://www.pon.nic.in/open/depts/ecostat/homepage>.
13. Cooper,J., Schulman,E., and Jamal,N. (2012). Current Status on the Development and Treatment of Myopia. *Optometry - Journal of the American Optometric Association*, 83(5).
14. Dennison,P. (2014). Outdoor Activity Reduces the Prevalence of Myopia in Children, 10- 13.
14. Felger.E.(2013, March). An Interdisciplinary Under Graduate Research Project On What Causes Myopia And How To Prevent It. *American society For Engineering Education*, Norwich University.
16. Gazzard, G.,Haley. C.S., and Saw, S. M. (2007). Correlations in refractive errors between siblings in the Singapore Cohort Study of Risk factors for Myopia. *British Journal of Ophthalmology*, 91(6), 781-784. [10.1136/bjo.2006.107441](https://doi.org/10.1136/bjo.2006.107441).
17. Gopinathan,G.,Dhiman,K., and Singh,K., (2013, April 12). Clinical study to evaluate the efficacy of Trataka yoga kriya and eye exercises. Doi:10.4103/0974-8520.110534.
18. Guggenheim,J.A.,Wong,R,P., Haley,C.S., and Saw,S.M.(2006, June). Singapore Cohort Study of the Risk factors for Myopia. *British Journal*

Ophthalmology. 91(6), 781–784. Published online Nov 29, 2006. doi: 10.1136/bjo.2006.107441PMCID: PMC195560.

19. Hennesy,C., Badjou,S.(2013)An inter disciplinary under graduate Project on what causes Myopia and How to prevent it. *American Society for Engineering Education*.
20. Hildreth, H.R., Meinberg, W.H.,and Milder, B. (1999). The effect of visual training on existing myopia. *American Journal of Ophthalmology*. 30:1563-76.
21. Huxley,A. (2013). The Art of Seeing; See clearly method retrived from website [www.htt//optometrist.com.au](http://www.optometrist.com.au).
22. Kalikivayi,V.,and Manish., (1997) study to determine the prevalence of visual impairment due to refractive errors and ocular diseases in lower middle class school children.
23. Kartz,J. (1996). Epidemiology of myopia. Johns Hopkins university school of hygiene and public health. 18(2), 175-184.
24. Kokkinakis,J. (2012, July). Exercise to Reduce Myopia. Retrieved from website: optometrist.com.au.
25. Kozier, B., and Erb. (2001). Fundamentals of Nursing, (8th Ed). Boston; Pearson.
26. Leber,L.,and Wilson,T.A. (1993). Myopia Reduction Training with a computer based behavioural technique. *Journal of behavioural optometry* vol:4, 82-87.
27. Mohamed, A. (2013) vision therapy –based programme for myopia control in adolescents, Department of health rehabilitation sciences Middle -East. *Journal of scientific research* 13(3)390-396 DOI:10.5829.

28. Noto,P.D.,and Hamed,S.B. (2013) Eye Exercises Enhance Accuracy and Letter Recognition, but Not Reaction Time, in a Modified Rapid Serial Visual Presentation Task, PLoS One.2013; 8(3):.Published online Mar 19,2013. doi: 10.1371/ PMID: PMC3602039.
29. Pavithra. (2008). Vision Screening Procedures For Infancy, Childhood And School Age Children. Retrieved from website: www.health.state.mn.us.
30. Polit, F. D., and Hungler, P. B. (2008). Nursing Research Principles and methods. (6th Ed), Philadelphia: Lippincott Publications.
31. Potter. P. A., and Perry, A.G. (2005). Fundamentals of Nursing, (6th Ed) Philadelphia; Lippincott.
32. Quinn,G.E. (1999, May). Myopia and ambient lighting at night. *Nature International journal of science*, Retrieved from website: <http://www.nature.com/nature/journal/v399/n6732/abs/399113>.
33. Rose, K.A. (2008). Outdoor activity reduces the prevalence of myopia in children.*Ophthalmology*, (115), 1279-1285.
34. Rose,k.,and Morgan,I.G. (2008). Outdoor Activity Reduces Prevalence of Myopia in Children. *Journal of American Academy of Ophthalmology*, (115), 1279-1285.
35. Rosen, R.C., Schiffman, H.R., and Meyers, H. (1985). Behavioral treatment of myopia:Refractive error and acuity changes in relation to axial length and intraocular pressure. *American Journal of Optometry Physiology Optometry*, vol.61.

36. Ross and Wilson(1995)Anatomy and Physiology I Health and Illness, 11th edition. Elsevier publications 185-207.
37. Rupolo, G., Angi, M., and Sabbadin, E. (1997). Treating myopia with acoustic biofeedback: A prospective study on the evolution of visual acuity and psychological distress. PMCID 1280.
38. Saw, S.M., Katz,J., Schein, O.D. (2002). Epidemiology of myopia. Retrieved from website: http://www.allaboutvision.com/parents/vision_therapy.htm).
39. Saw, S.M., Tan, S.B., and Fung, D. (2004). IQ and the Association with Myopia in Children. Invest ophthalmology Vision Science (45), 2943– 2948.
40. Saw,S.M ., and Gazzard,G. (2002). Myopia attempts to arrest progression. *British journal of ophthalmology*, 86(11), 1306-1311, PMCID 1771373.
41. Saw,S.M. (2006). A Cohort Study of Incident Myopia in Singaporean Children. *IOVS Journal* vol. 47, 51839-51844.
42. Schmid, K.L., and Brown, B. (2014). "The autonomic control of accommodation and implications for human myopia development: A review".*Ophthalmic & physiological optics : The journal of the British College of Ophthalmic Opticians (Optometrists)*, 23(5), 401– 422. doi:10.1046/j.1475-1313.2003.00135.xPMID 12950887.
43. Suresh. (2007) My visit to Pondicherry Aurobindo ashram, retrieved . Retrieved from website: www.health.state.mn.us
44. Taylor,H., Morgan, I.G., Smith, W., Burlutsky, G., Mitchell, P., and Saw, S.M. (2008). Myopia, Lifestyle, and Schooling in Students of Chinese Ethnicity in Singapore and Sydney". *Archives of Ophthalmology*, 126(4), 527–530.

45. Vandhana,R.J ., and Desai,D.P. (2011)Effects of eye exercises on myopia-RCS.*Journal of Pharmecutical and bio Medical Sciences*,volume 10, 1-7.
46. Vashisht, S.D., and Meenakshi, K. (2008). Magnitude of refractive errors among school children in a rural block of Haryana. *The internet journal of epidemiology*, 6(2).
47. Vision Therapy Eye Wear Manual. (2006)Natural Vision Centre Malaysia Pg 1-5.
48. Wei, M. L. (2011). Does education explain ethnic differences in myopia prevalence? A population-based study of young adult males in Singapore. *Ophthalmology Vision Science*, 78(4), 234–239. doi:10.1097/00006324-200104000-00011. PMID 11349931.
49. Willson. (1995, May). The See Clearly Method & Other Programs: Do Eye Exercises Improve Vision?Retrieved from website: <http://www.allaboutvision.com>.
50. Woods, A.C. (1996). Report from the Wilmer Institute on the results obtained in the treatment of myopia by visual training. *American Journal of Ophthalmology*. vol.29, 28-57.
51. Worrall, R.S., Nevyas,J., and Barrett,S. (2001). Eye Related Quackery Retrieved from website: [http:// www.quackwatch.com](http://www.quackwatch.com).

SECTION II

SNELLEN CHART

The first standardized eye chart designed to measure visual acuity was introduced by Herbert Snellen in 1862. Although Snellen eye chart was introduced well over a hundred years ago, it is still the most common way to measure and report visual acuity. Visual acuity was checked first in the right eye with left eye occluded and vice versa which was measured at a distance of 6 meters. The expression “6/6” refers to a person’s normal visual acuity using the Snellen eye chart. The changes in the visual acuity was interpreted as follows;

Interpretation of Snellen Chart

Visual acuity(meters)	Scores	Results
6/60	1	HIGH MYOPIA
6/36	2	HIGH MYOPIA
6/24	3	HIGH MYOPIA
6/18	4	LOW MYOPIA
6/12	5	LOW MYOPIA
6/9	6	LOW MYOPIA
6/6	7	NORMAL VISION

**REQUISITION LETTER TO VALIDATE THE RESEARCH TOOL AND
CONTENT**

From

Mrs. Jyophy k abraham

M.Sc (Nursing) 11 year,

College Of Nursing, SRIPMS,

Coimbatore.

To *The Medical Guide
Dr. N. Arivaghagan*

Through

The Principal,

College Of Nursing, SRIPMS,

Coimbatore.

Respected Sir/Madam,

Subject: Requesting permission to validate the tool and content

- I am Mrs. Jyophy k abraham doing my 11st year M.Sc Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc Nursing Program. I have undertaken the following study for my research **"EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN WITH MYOPIA IN SELECTED SCHOOLS, COIMBATORE"** The following tool is tend to be used, hence I request you to kindly give me a valuable suggestion and necessary modification for the same.

Thanking you.

Coimbatore,

yours sincerely,



(Mrs. Jyophy k abraham)


PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

CONTENT VALIDITY FORMAT

Name of the Expert: Dr. N. Arivazhagan

Address: SENIOR EYE SPECIALIST
ARAVIND EYE HOSPITAL
COIMBATORE

Kindly validate each section in the tool and mark wherever applicable.

S.NO	SECTIONS OF THE TOOL	STRONGLY AGREE	AGREE	NEED NOTIFICATION	REMARKS
1.	SECTION-A		✓		
2.	SECTION-B	✓			
3.	SECTION-C	✓			

Total content of the tool: Adequate/Inadequate

Date: 04.07.13

Dr. N. Arivazhagan 4/7/13

Signature of the Expert

Dr. N. ARIVAZHAGAN
D.O., B. Optom., FLVPEI, IACLE RMP
EYE SPECIALIST
Govt. Reg. No. 13308
CORRESPONDENT
SAAI PARAMEDICAL INSTITUTE
17/1, BALAJINAGAR, COIMBATORE-64
COIMBATORE - 64
PH 0422 2570475, 9995 133082, 5426117003

**REQUISITION LETTER TO VALIDATE THE RESEARCH TOOL AND
CONTENT**

From

Mrs. Jyophy k abraham
M.Sc (Nursing) 11 year.
College Of Nursing, SRIPMS,
Coimbatore.

To *Prof. Emmerentia*
Rvs college of Nursing
Sulur. Coimbatore
Through

The Principal,
College Of Nursing, SRIPMS,
Coimbatore.

Respected Sir/Madam,

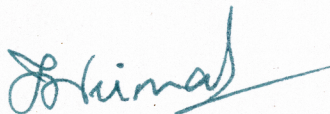
Subject: Requesting permission to validate the tool and content

- I am Mrs. Jyophy k abraham doing my 11st year M.Sc Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc Nursing Program. I have undertaken the following study for my research **"EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN WITH MYOPIA IN SELECTED SCHOOLS, COIMBATORE"** The following tool is tend to be used, hence I request you to kindly give me a valuable suggestion and necessary modification for the same.

Thanking you.

Coimbatore,

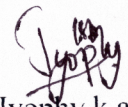
yours sincerely,



PRINCIPAL

College of Nursing

Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641044


(Mrs. Jyophy k abraham)

CONTENT VALIDITY FORMAT

Name of the Expert: Prof. Emmentia

Address: Rvs college of Nursing
Sulur, Coimbatore

Kindly validate each section in the tool and mark wherever applicable.

S.NO	SECTIONS OF THE TOOL	STRONGLY AGREE	AGREE	NEED NOTIFICATION	REMARKS
1.	SECTION-A		✓		
2.	SECTION-B		✓		
3.	SECTION-C		✓		

Total content of the tool: Adequate/Inadequate

Date: 27.12.13


Signature of the Expert



**REQUISITION LETTER TO VALIDATE THE RESEARCH TOOL AND
CONTENT**

From

Mrs. Jyophy k abraham

M.Sc (Nursing) 11 year,

College Of Nursing, SRIPMS,

Coimbatore.

To *Prof. L. Parimala Devi*
Kongunadu college of nursing
Coimbatore.

Through

The Principal,

College Of Nursing, SRIPMS,

Coimbatore.

Respected Sir/Madam,

Subject: Requesting permission to validate the tool and content

- I am Mrs. Jyophy k abraham doing my 11st year M.Sc Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc Nursing Program. I have undertaken the following study for my research **"EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN WITH MYOPIA IN SELECTED SCHOOLS, COIMBATORE"** The following tool is tend to be used, hence I request you to kindly give me a valuable suggestion and necessary modification for the same.

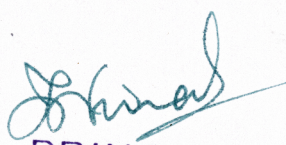
Thanking you.

Coimbatore,

yours sincerely,



(Mrs. Jyophy k abraham)


PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

CONTENT VALIDITY FORMAT

Name of the Expert: L. Parviala Devi, M.Sc (N)
Address: Recdes,
- Kongunadu College of Nursing
CBE.

Kindly validate each section in the tool and mark wherever applicable.

S.NO	SECTIONS OF THE TOOL	STRONGLY AGREE	AGREE	NEED NOTIFICATION	REMARKS
1.	SECTION-A			✓	
2.	SECTION-B		✓		
3.	SECTION-C		✓		

✓
Total content of the tool: Adequate/Inadequate

Date: 27.12.13



L. Parviala Devi
Signature of the Expert

**REQUISITION LETTER TO VALIDATE THE RESEARCH TOOL AND
CONTENT**

From

Mrs. Jyophy k abraham

M.Sc (Nursing) 11 year,

College Of Nursing, SRIPMS,

Coimbatore.

To

Prof. P. Shanthy
Vice Principal
G. K. N. M Hospital

Through

The Principal,

College Of Nursing, SRIPMS,

Coimbatore.

Respected Sir/Madam,

Subject: Requesting permission to validate the tool and content

- I am Mrs. Jyophy k abraham doing my 11st year M.Sc Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc Nursing Program. I have undertaken the following study for my research **"EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN WITH MYOPIA IN SELECTED SCHOOLS, COIMBATORE"** The following tool is tend to be used, hence I request you to kindly give me a valuable suggestion and necessary modification for the same.

Thanking you.

Coimbatore,

yours sincerely,



PRINCIPAL

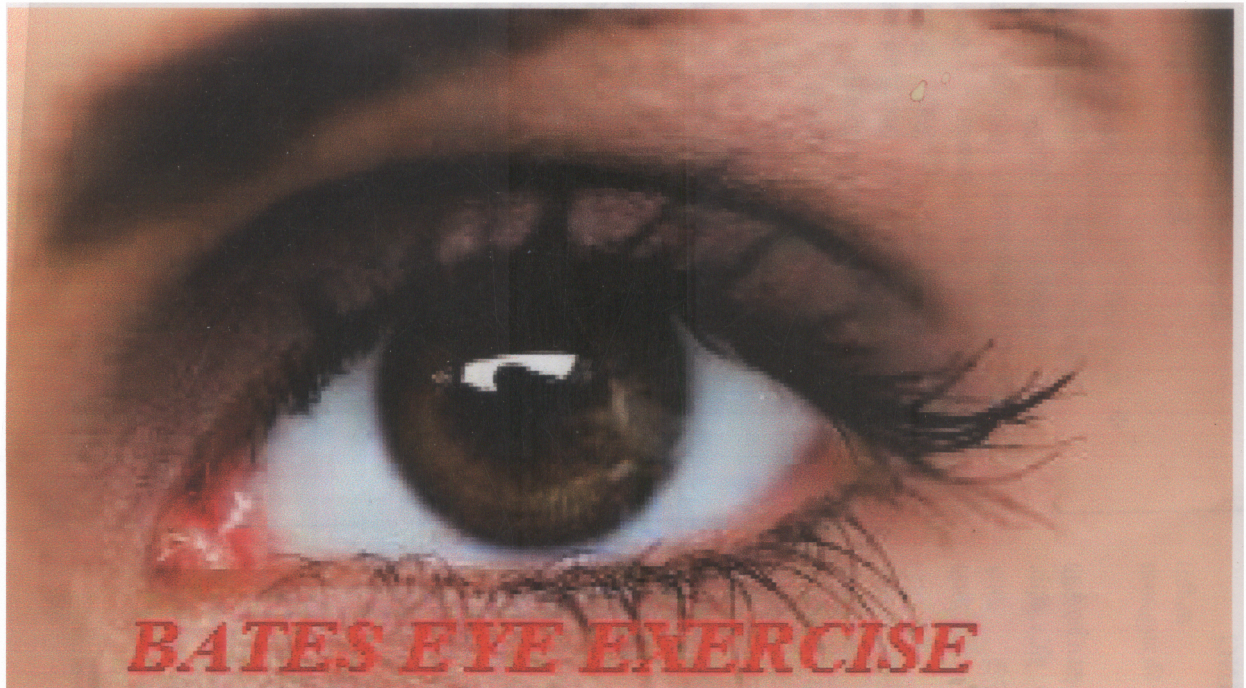
College of Nursing

Sri Ramakrishna Institute of Paramedical Sciences

Coimbatore - 641 044



(Mrs. Jyophy k abraham)



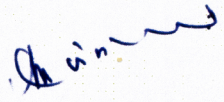
Prepared By

Mrs. Jyophy K. Abraham
M.Sc. (N) II year
Child Health Nursing
College of Nursing
SRIPMS, Coimbatore

CERTIFICATE FOR TAMIL EDITING
TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation, "EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN AT SELECTED SCHOOLS, COIMBATORE" done by JYOPHY.K. ABRAHAM, II YEAR M.sc Nursing, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore has been edited for Tamil language appropriateness.

Name : : Mrs.Dr.K.Bhagyam
Designation : :HOD Tamil Department
Name of the Institution : :Sri Ramakrishna College Of Arts And Science
Signature :


துறைத்தலைவர்
தமிழ்த்துறை
ஸ்ரீ இராமகிருஷ்ணா
மகளிர் கலை அறிவியல் கல்லூரி
கோயம்புத்தூர் - 641 044.

கண் அசைவு பயிற்சியின் செய்முறை

செய்முறை-1 SUNNING

- ❖ 60 watt மின்விளக்குக்கு முன்பாக கண்களை மூடி அமரவும். பின்பு மெதுவாக விளக்கின் வெளிச்சம் விழுமாறு செய்யவும்.
- ❖ கண்களை மூடி அதன் முன்பாக ஒரு படுக்கைகோடை கற்பனை செய்து கொள்ளவும்.
- ❖ பின்பு கற்பனை கோட்டின் ஒரு புறத்திலிருந்து மற்றொரு புறமாக தலையைத் திருப்பவும்.
- ❖ ஒவ்வொரு முறை தலையைத் திருப்பும் போது உங்களின் ஒரு கண் நிழல் வயத்திலும் மற்ற கண் வெளிச்சத்திலும் இருக்கும்.
- ❖ ஒரு திருப்புதலுக்கு 3 நொடிகள் எடுத்ததுக் கொள்ளவும்.

செய்முறை-2 PALMING

- ❖ முதல் செய்முறையைத் தொடர்ந்து இரண்டாம் செய்முறையை உடனே செய்யவும்.
- ❖ மின்விளக்கை அணைத்த பின் உங்கள் கைகள் கொண்டு மூடவும்.
- ❖ ஒரு கையின் மேல் மற்றொரு கையை குறுக்காக வைத்து கண்களை முடினால் இலகுவாக இருக்கும்.
- ❖ நீங்கள் சௌகரியமாகும் வரை விளக்கை அணைத்து ஓய்வு எடுக்கவும்.
- ❖ இச்செய்முறையை 10 முதல் 15 நிமிடங்கள் செய்யவும்.

செய்முறை-3 SWINGING

- ❖ பென்சில் போன்ற கூரிய முனைப்பகுதியுடைய பொருளை எடுத்துக் கொள்ளவும்.
- ❖ இரண்டு கைகளாலும் அதைப்பிடித்து உங்கள் கண்களுக்கு நேராக நீட்டவும்.
- ❖ இரண்டு கால்களையும் ஒரு அடி இடைவெளி தூரத்தில் பிரித்து வைக்கவும்.
- ❖ இப்பொழுது நீட்டி வைத்திருக்கும் கையை இடதுபுறமாக கொண்டு செல்லும் போது வலது புற காலை உயர்த்தவும். இதைப்போன்று மறுபுறமும் செய்யவும்.
- ❖ கண்களை கூரிய முனையுடைய பொருளைப் பார்த்த படி கை செல்லும் திசையில் தோள்பட்டையும் தலையும் செல்ல வேண்டும்.
- ❖ கைகளை அசைக்கும் 45 கோணத்தில் இடவலமாக அசைக்கவும். பின்னர் அதை 90 கோணமாக கூட்டவும்.
- ❖ மூன்றாம் செய்முறையை முடித்த பின் இரண்டாம் செய்முறையை மறுபடியும் செய்யவும்.

செய்முறை-4 SIMPLE BLINKING

- ❖ எளிமையான முறையில் கண்களை அசைத்து தானாகவே மூடி மூடி திறக்கவும்.

செய்முறை-5 SIMPLE EYE EXERCISES

- ❖ உங்கள் கருவியை ஒரு புறத்திலிருந்து மறு புறத்திற்கு நகர்த்தும் போது ஒவ்வொரு திசையிலுமுள்ள முதலில் கண்ணில் படும் பொருட்களை அடையாளம் கண்டு அதை மேலும் நுணுக்கமாக அடையாளம் காண முயற்சிக்கவும்.
- ❖ கண்களின் கருவியை சுழற்றுப் பயிற்சி செய்யும் போது கண்ணில் படும் பொருட்களின் மீது கவனம் செலுத்தவும். இதைப் போன்று எதிர் திசையிலும் கருவிகளை சுழற்றவும்.
- ❖ கண்களின் முன்னே எண் 8 ஐ கற்பனை செய்யவும். அதன் வழியில் கண்களைச் சுழற்றி எதிரில் தெரியும் பொருட்களை காண முயற்சிக்கவும்.
- ❖ ஒரு பெரிய கடிகாரத்தை கண் முன் கற்பனை செய்யவும். இப்பொழுது கற்பனை கடிகாரத்தில் எண் 12 ஐ பார்க்கவும். அங்கிருந்து கடிகாரத்தின் நடு புள்ளிக்கு கண்களை கொண்டு வரவும். மீண்டும் அங்கிருந்து எண் 1 ஐ பார்க்கவும். இதே போன்று தொடர்ந்து முழுவட்ட கடிகார எண்களைக் கொண்டு பயிற்சி செய்யவும்.
- ❖ இப்பொழுது கண் தசைகளை ஓய்வு நிலைக்கு கொண்டு வரவும்.

பகுதி-I[பின்னணி விவரம்]

- 1.மாதிரி எண் :
- 2.வயது :
- 3.பாலினம் :
- 4.கல்வி தகுதி :
- 5.பொழுதுபோக்கு :
- 6.விளையாட்டு விருப்பம் :

உள்ளரங்க விளையாட்டுகள் இருப்பின் குறிப்பிடுக

வெளிப்புற விளையாட்டுகள் இருப்பின் குறிப்பிடுக

பகுதி- [பெற்றோர்கள் விவரம்]

	தந்தை	தாய்
1.வயது		
2. கல்வி தகுதி		
3.வேலை		
4.அலைபேசி		
5.கண்கண்ணாடி பயன்படுத்துகிறீர்களா?		

பகுதி-II [பார்வை சம்பந்தமான விவரம்]

- 1.எவ்வளவு காலங்களாக கண்கண்ணாடி அணிந்திருக்கிறீர்கள்?
- 2.உங்கள் கண்கண்ணாடியின் பார்வை அளவு தெரியுமா?
- 3.நீங்கள் படிக்கும் போதோ அல்லது வீட்டுப்பாடம் செய்யும் பொழுதோ தலைவலி வருவதுண்டா?
- 4.உங்களுக்கு தலைவலி வந்தால் எவ்வளவு நேரம் நீடிக்கும்(மணிநேரம்)(நிமிடங்கள்)
- 5.இதற்கு முன்பாக கண் சம்பந்தமான நோய் வந்திருக்கின்றதா?
- 6.ஒரு வாரத்தில் நீங்கள் எத்தனைப் புத்தகங்கள் அல்லது பத்திரிக்கைகள் படித்த முடிப்பீர்கள்?
7. நீங்கள் பொதுவாக படிக்கமு் போது எவ்வகையான வெளிச்சத்தை பயன்படுத்துவீர்கள்?
- 8.ஒரு நாள் எத்தனை மணிநேரம் நீங்கள் தொலைக்காட்சி காண்பீர்கள்?
- 9.எவ்வளவு தூரத்தில் அமர்ந்து நீங்கள் தொலைக்காட்சி காண்பீர்கள்?
- 10.கணினியின் முன்பாக எவ்வளவு நேரம் செலவு செய்வீர்கள்?

அனுப்புனர்:

திருமதி .ஜோ.பி.கே.ஆபிரகாம்

MSc நர்சிங் இரண்டாம் வருடம்

இராமகிருஷ்ணா நர்சிங் காலேஜ்

கோவை-44

பெறுநர்:

மதிப்பிற்குரிய ஐயா\அம்மா

பொருள்:உங்கள் குழந்தைக்கு கண் அசைவு பயிற்சி செய்விப்பதற்கான ஒப்புதல் விண்ணப்பம்.

உங்கள் குழந்தைக்கு கிட்டப்பார்வை என்பதை ஏற்கனவே கண்டறியப்பட்டு கண்ணாடி அணிவிக்கப்பட்டுள்ளார்.அதனால் உங்கள் குழந்தைக்கு கண் அசைவு பயிற்சி அறிக்க விரும்புகிறேன்.இப் பயிற்சியில் உங்கள் குழந்தையை ஈடுபடுத்திக் கொள்ள உங்கள் அனுமதியை தாழ்மையுடன் கேட்டுக் கொள்கிறேன்.

தேதி:

தங்கள் உண்மையுள்ள

கோயம்புத்தூர்

ஒப்புதல் விண்ணப்பம்

என் குழந்தையை கண் அசைவு செய்முறைப் பயிற்சிக்கு ஈடுபடுத்திக் கொள்ள அனுமதி அளிக்கிறேன்.

பெற்றோர் கையொப்பம்

மாணவன் \மாணவியின் பெயர்:

வகுப்பு:

SECTION I QUESTIONNAIRE

DEMOGRAPHIC PROFILE OF CHILDREN

1. Sample No :
2. Age :
3. Gender :
4. Education :
5. Hobbies: :
6. Interested games –Indoor /outdoor
 - a. If indoor specify :
 - b. If outdoor specify :

DEMOGRAPHIC PROFILE OF PARENTS

	Father	Mother
Age		
Education		
Occupation		
Wearing Glasses		
Mobile number		

DETAILS REGARDING THE VISION AND ITS RELATED FACTORS

1. How long you are wearing glasses?
2. Do you know your optical power?
3. Do you have headaches when reading or doing home work?
4. .How long do the head-ache usually last? (Hrs/Minutes)
5. Do you have any eye infections before?
6. .How many books or magazines do you finish reading in a week?
7. What type of lighting is normally used when you read or do class work?
8. How much time you watch television in a day?
9. How much distance away you sit and watch television?
10. How long you sit in front of the computer in a day?

From

Jyophy.k.Abraham
Msc[Nursing] 1st year
College of nursing
Sri Ramakrishna institute of paramedical sciences
Coimbatore 44

To

THE SECRETARY
SARVAJANA SCHOOL & PSG PRIMARY SCHOOL
PEELAMEDU
COIMBATORE

Through

The principal
College of nursing
Sri Ramakrishna institute of paramedical sciences
Coimbatore 44

Subject: Requesting permission to conduct the study in your esteemed institution reg

Respected sir/madam

As my part of my Msc [nursing] programme , I wish to conduct the study on "EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN AT SELECTED SCHOOLS ,COIMBATORE" I would like you to give permission to conduct the study in your institution I would be kind enough in obeying your institution rules and regulation. I kindly request you to do the needful

Thanking you

Date:

Place:

[Signature]
PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641044

Yours obediently
[Signature]
Jyophy.k.Abraham

[Signature] 10.12.13
HEADMISTRESS
PSG PRIMARY SCHOOL
PEELAMEDU
COIMBATORE-641 004.

From

Jyophy.K.Abraham
Msc [Nursing] 1st year
College of nursing
Sri Ramakrishna institute of paramedical sciences
Coimbatore 44

To

THE SECRETARY
CMS NURSERY AND PRIMARY SCHOOL
COIMBATORE

Through

The principal
College of nursing
Sri Ramakrishna institute of paramedical sciences
Coimbatore 44

Subject: Requesting permission to conduct the study in your esteemed institution reg

Respected sir/madam

As my part of my Msc [nursing] programme, I wish to conduct the study on "EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN AT SELECTED SCHOOLS, COIMBATORE". I would like you to give permission to conduct the study in your institution I would be kind enough in obeying your institution rules and regulation. I kindly request you to do the needful


Thanking you

Date: 22-06-2013

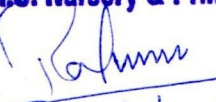
Place: Coimbatore


PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

Yours faithfully


Jyophy.K.Abraham

For C.M.S. Nursery & Primary School


14/11/2013 **Secretary**

Forwarded.
Jyophy.K.Abraham
(J.KALACHELUVI)
Guide.



APPENDIX I

PERMISSION LETTER FOR CONDUCTING THE STUDY

From

MRS. Jyophy .k.Abraham
M.Sc (Nursing) I year,
College Of Nursing, SRIPMS,
Coimbatore.

To

THE SECRETARY
VISAYA VIDHYALAYA PRIMARY
AND NURSERY SCHOOL
P. N. PALAYAM / COIMBATORE-37

Through

The Principal,
College Of Nursing,
SRIPMS,
Coimbatore.

Respected Sir/Madam,

Subject: Requesting permission to conduct study

I am Mrs.Jyophy.K.Abraham doing my 1st year M.Sc Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc Nursing Program. I have undertaken the following study for my research "**Effect of Bates exercise on visual acuity among school children in selected schools,Coimbatore**". I would like to do the above said study in your reputed institution. I humbly request you to grant me the permission to conduct the study in your esteemed institution. Here with I am attaching a brief copy of the research proposal.

Thanking you.

Yours sincerely,

Date:

Place:

Shri Vijaya Vidyalaya
Nursery and Primary School

PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

MRS.Jyophy.k.Abraham

From

Jyophy.K.Abraham
Msc [Nursing] 1st year
College of nursing
Sri Ramakrishna institute of paramedical sciences
Coimbatore 44

To

The Principal
Rasakondalar Matric. Hr. Sec. School
Nethaji Road - Coimbatore

Through

The principal
College of nursing
Sri Ramakrishna institute of paramedical sciences
Coimbatore 44

Subject: Requesting permission to conduct the study in your esteemed institution reg

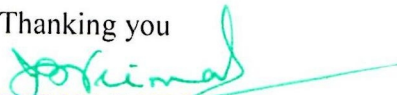
Respected sir/madam

As my part of my Msc [nursing] programme, I wish to conduct the study on "EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN AT SELECTED SCHOOLS, COIMBATORE". I would like you to give permission to conduct the study in your institution I would be kind enough in obeying your institution rules and regulation. I kindly request you to do the needful

Thanking you

Date: 22-08-2013

Place: Coimbatore


PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

Yours faithfully

Permitted (in January)

20/11/13


Jyophy.K.Abraham

Forwarded,
J. K. A. C. H. E. V.
G. U. D. E.

PRINCIPAL
RASAKONDALAR MAT. HR. SEC. SCHOOL,
NETHAJI ROAD, PAPPANAICKENPALAYAM,
COIMBATORE - 641 037.

CONTENT VALIDITY FORMAT

Name of the Expert: P. SHANTHI

Address: Vice principal
Institute of Nursing
G.K.N.M. Hospital

Kindly validate each section in the tool and mark wherever applicable.

S.NO	SECTIONS OF THE TOOL	STRONGLY AGREE	AGREE	NEED NOTIFICATION	REMARKS
1.	SECTION-A	✓			
2.	SECTION-B	✓			
3.	SECTION-C	✓			

Total content of the tool: Adequate/Inadequate ✓

Date: 27/12/13

P. Shanthi
Signature of the Expert

SHANTHI P.
VICE PRINCIPAL
INSTITUTE OF NURSING
G.K.N.M. HOSPITAL
COIMBATORE - 641 037.

CERTIFICATE FOR ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation, "EFFECT OF BATES EXERCISE ON VISUAL ACUITY AMONG SCHOOL CHILDREN AT SELECTED SCHOOLS, COIMBATORE" done by JYOPHY. K. ABRAHAM, II YEAR M.sc Nursing, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore has been edited for English language appropriateness.

Name : : V.V.Issahac, MA(Eng), MA(Soc), MPhil(Edn), MBA(Hrm)

Designation : : Principal

Name of the Institution : : BHMTTI, THENNATTILAPARAMBA
Kannamangalam West P.O.

Signature : 

Acknowledgement

Contents

List of Tables

List of Figures

List of Annexures

Abstract

Chapter – I

Introduction

Chapter – II

Review of Literature

Chapter – III

Methodology

Chapter –IV

Data Analysis and Interpretation

Chapter –V

Results and Discussion

Chapter –VI

Summary and Conclusion

References

List of Appendices

Appendices
